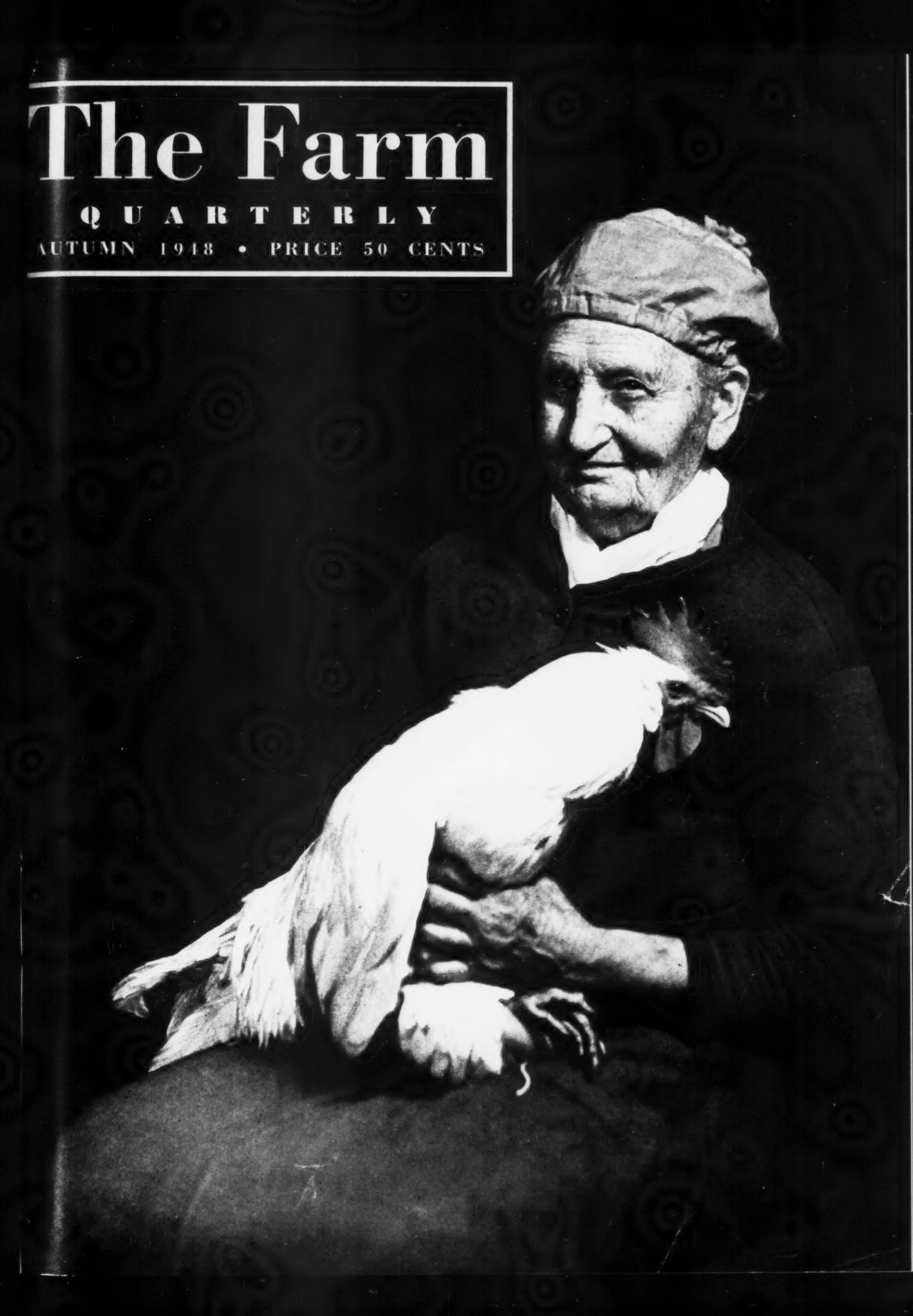
The Farm

QUARTERLY

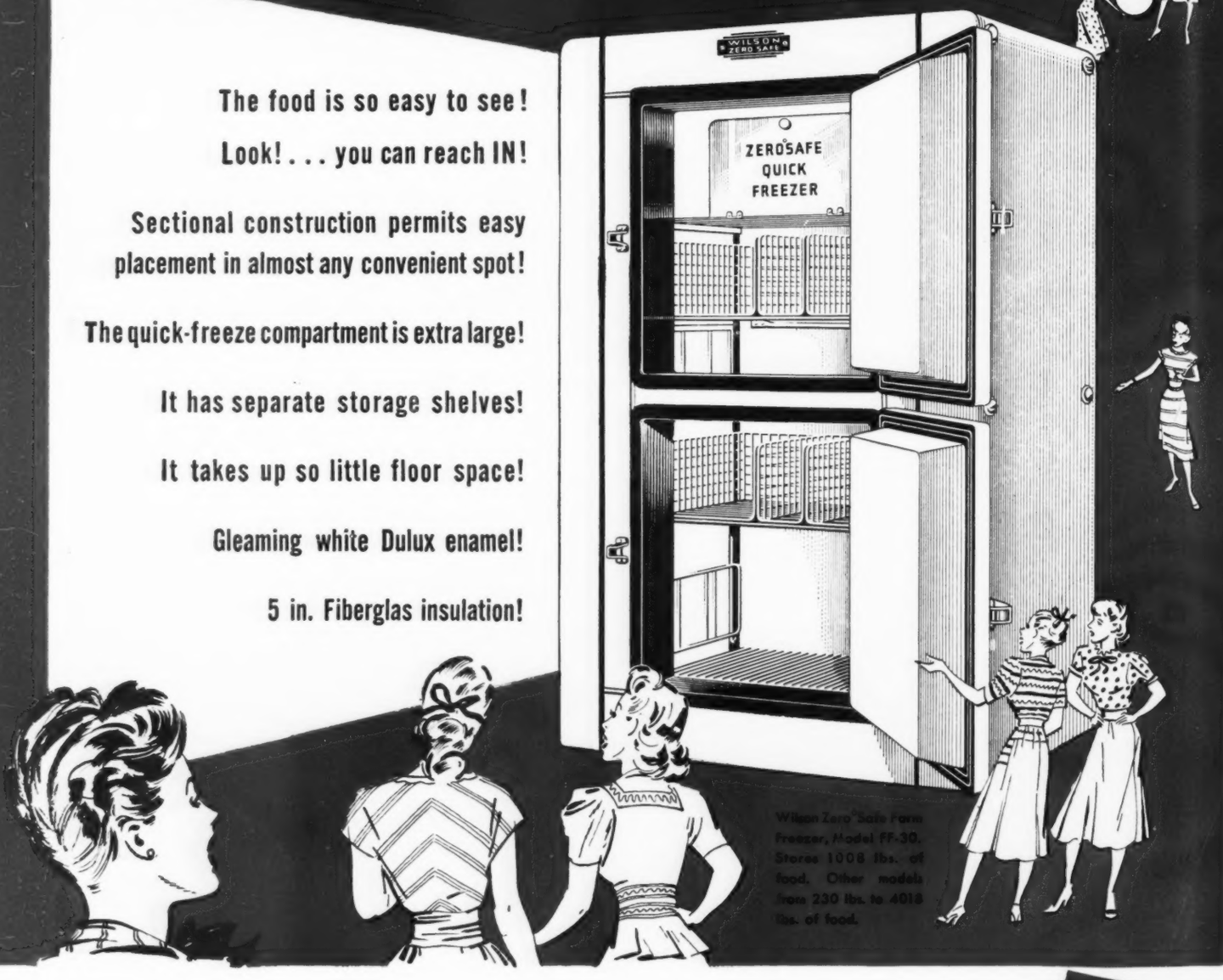
AUTUMN 1948 • PRICE 50 CENTS



Look 'em all over . .
but don't overlook

WILSON!

The Reach-In Freezer for the Farm



The food is so easy to see!

Look! . . . you can reach IN!

Sectional construction permits easy placement in almost any convenient spot!

The quick-freeze compartment is extra large!

It has separate storage shelves!

It takes up so little floor space!

Gleaming white Dulux enamel!

5 in. Fiberglas insulation!

Wilson Zero°Safe Farm Freezer, Model FF-30. Stores 1008 lbs. of food. Other models from 230 lbs. to 4018 lbs. of food.

Here's the freezer that really fits farm needs . . . the upright freezer with front-opening convenience . . . the freezer with the big, quick-freeze compartment for faster freezing . . . the freezer with separate storage shelves for easy access to food . . . the freezer that occupies the smallest floor space per cubic foot of capacity.

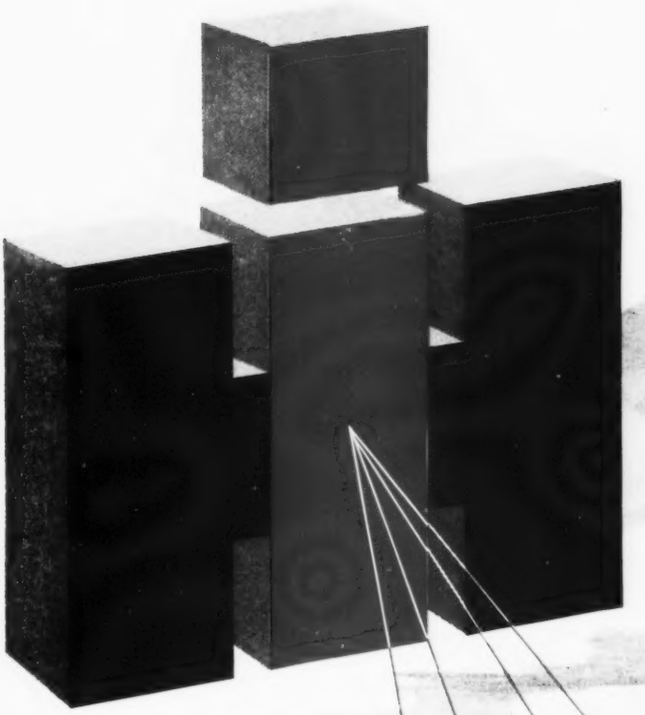
Send today for your copy of the Wilson Freezer Guide . . . your guide to better living.

WILSON REFRIGERATION, INC.

DIVISION OF WILSON CABINET CO., INC., SMYRNA, DELAWARE

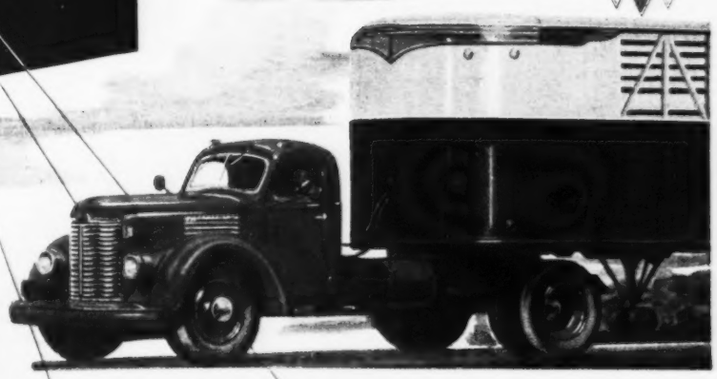
FARM MILK COOLERS and FREEZERS

DEALERS EVERYWHERE OR WRITE US DEPT. FG

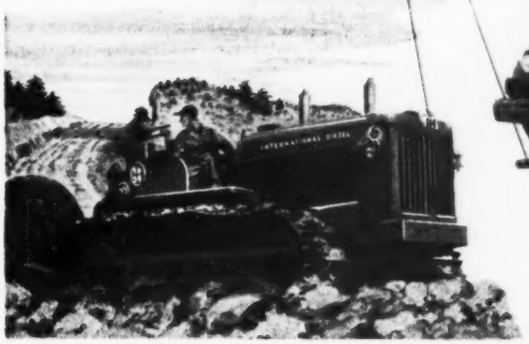


THIS SYMBOL MEANS...

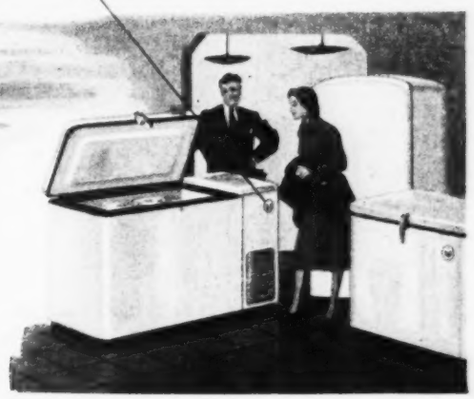
Product of INTERNATIONAL HARVESTER



The International Truck Line provides the right truck for every job. It is the *only* complete line built. It *specializes* into more than 1,000 types of trucks, with gross weight ratings ranging from 4,400 to 90,000 pounds.



Biggest and most powerful of International Crawler Tractors is the 18-ton, 180 h.p. model TD-24 . . . newest member of a mighty Diesel lineup. In fields and groves, farmers rely on Internationals for ready adaptability and low-cost performance.



Two International Harvester Freezers—4 and 11 cu. ft. sizes—bring the year-around, at-hand convenience of frozen foods to large and small families alike. And see the new IH household refrigerator.

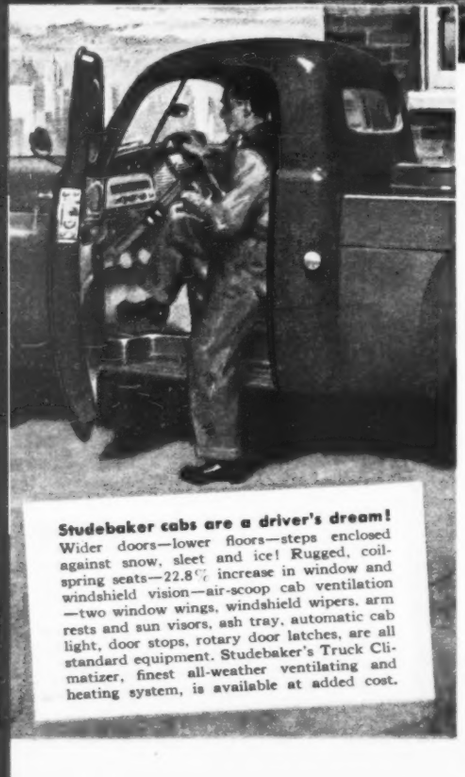
A quarter of a century ago, an engineer's idea . . . today, a reality: a group of five all-purpose tractors with matched machines for every size farm, every crop and soil condition. *That's the Farmall System!* Above: Farmall C with TOUCH-CONTROL.

Good listening! James Melton on "Harvest of Stars." Wednesday evenings, CBS Network.

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue Chicago 1, Illinois

World's newest trucks!
NEW 1949 STUDEBAKERS



Studebaker cabs are a driver's dream! Wider doors—lower floors—steps enclosed against snow, sleet and ice! Rugged, coil-spring seats—22.8% increase in window and windshield vision—air-scoop cab ventilation—two window wings, windshield wipers, arm rests and sun visors, ash tray, automatic cab light, door stops, rotary door latches, are all standard equipment. Studebaker's Truck Climatizer, finest all-weather ventilating and heating system, is available at added cost.

New in design! New in exclusive features!

THAT HUSKY handsome, new 1949 Studebaker truck you see above is more than a breath-taking new style

It's a revolutionary change for the better in truck engineering.

It's a truck that's a stand-out example of the star-studded new Studebaker super line for '49—the easiest trucks to drive and to service that ever wheeled a load.

These sensational 1949 Studebaker trucks are new through and through—even the way they ride is a delightful new experience in relaxed comfort.

They're the world's first trucks with a new kind of "lift-the-hood" accessibility—no standing on a box to get at the engine or ignition—no fumbling under the dash panel to service the instruments or accessories.

Studebaker dealers all over America are proudly showing this new Studebaker super line for '49 right now. Stop in for a close-up look at your first opportunity. More truck models than Studebaker ever offered! An extensive new range of sizes and wheelbases!

STUDEBAKER TRUCKS

NOTED FOR LOW COST OPERATION

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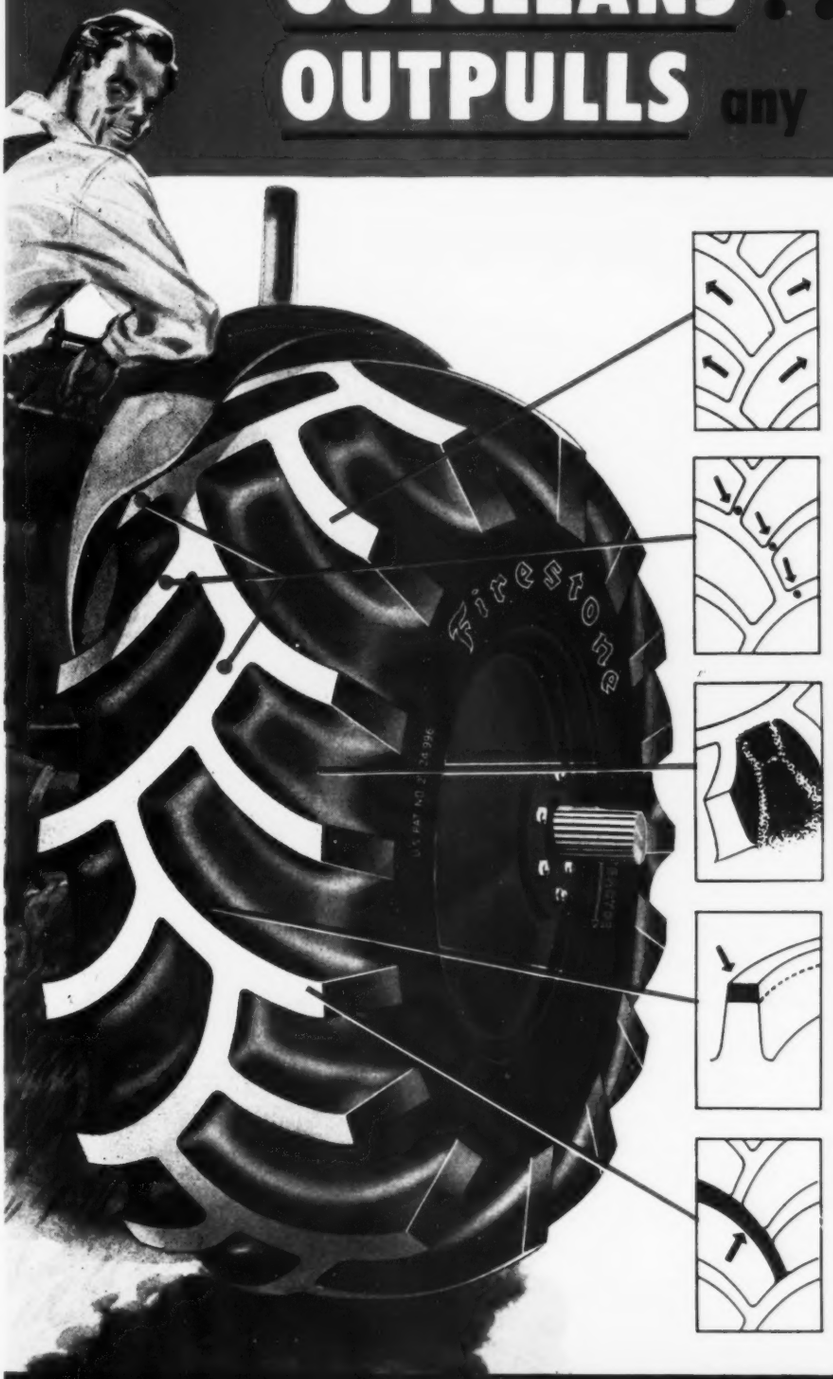
It's Plain as Day Why the Firestone CHAMPION GROUND GRIP

OUTCLEANS . . . and of course OUTPULLS any other tractor tire



It outcleans and, of course, outpulls because the traction bars curve outward from the center of the tire to make a wide open exit for mud and trash which are easily forced out of the tread wells by the rolling, flexing action of the tire.

It outcleans and, of course, outpulls because it has no open centers to catch trash which is generally the foundation for a completely filled up tire. Instead of filling up, the Champion Ground Grip remains clean and takes a "center bite" right in the heart of the traction zone.

It outcleans and, of course, outpulls because the tread wells are contoured to eliminate those sharp corners, angles and flat surfaces where mud and dirt could wedge and stick. There are no mud pockets.

It outcleans and, of course, outpulls because the tread bars are up to 24% higher. They take a deep, clean bite which forestalls slippage. A tread that does its work without slipping does not fill up. A tire that does not take a deep, full bite is the one that fills up.

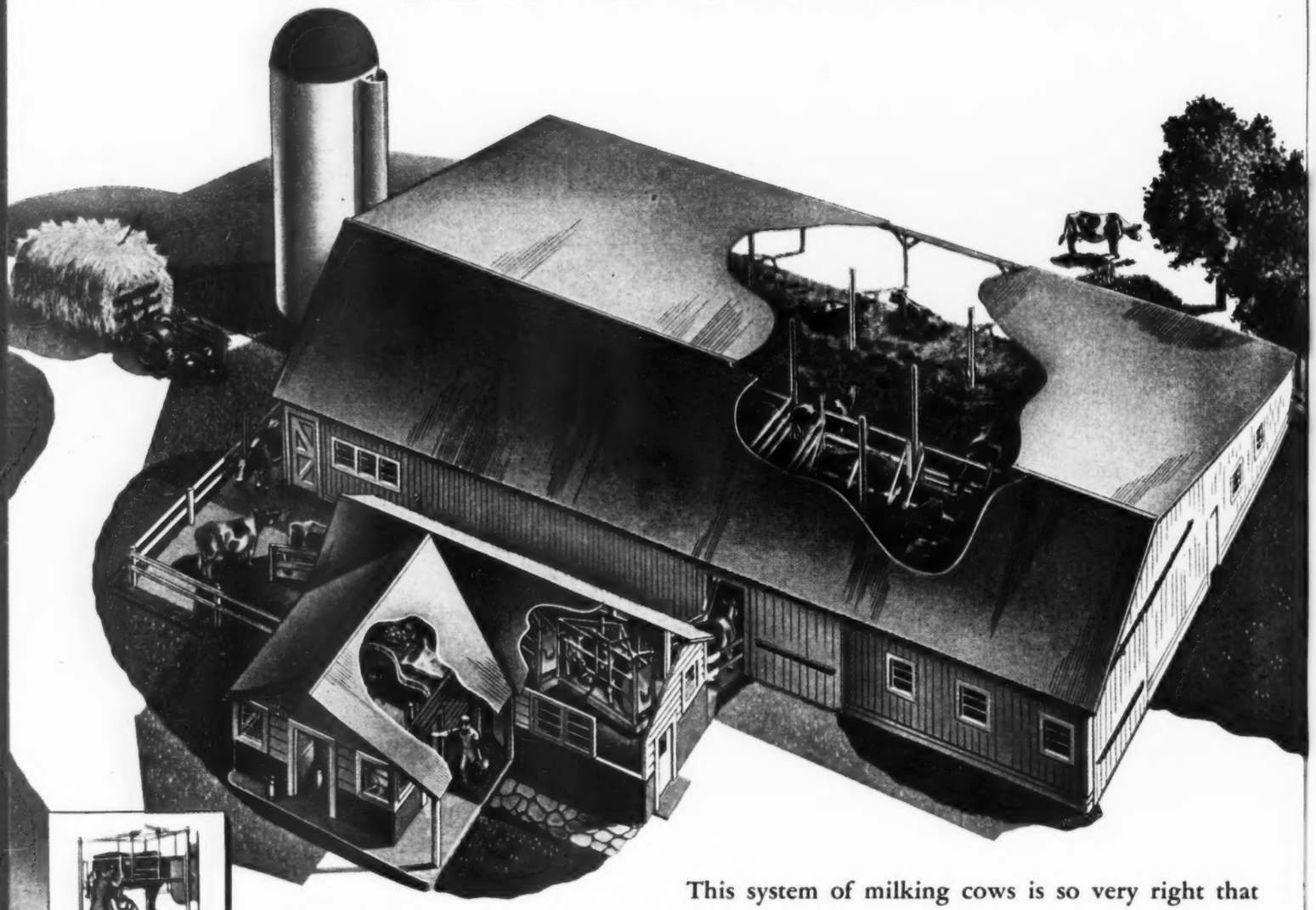
It outcleans and, of course, outpulls because the traction bars are longer—up to 256″ more bar length per tractor. Here again, greater bar length means a bigger, firmer bite—and as a certain result, perfect cleaning because there is no spinning.

Listen to the Voice of Firestone Monday evenings over NBC

Copyright, 1948, The Firestone Tire & Rubber Co.

. . . And because it OUTCLEANS and takes a CENTER BITE the FIRESTONE CHAMPION OUTPULLS every other tractor tire

THIS is the way Cows are Going to be Milked on *YOUR* Farm *SOME DAY!*



THIS Book will explain WHY...

Our Free Book describes the Surge System of milking cows and answers a lot of your questions . . . ask us for your copy.

This system of milking cows is so very right that its use is spreading rapidly . . . 1948 may not be the year that it will come to your farm but now is an excellent time for you to get all the facts . . . now is a good time to tell us to mail you the story of the Surge System of Milking Cows.

We are doing our level best—materials are still short, but we are now able to take care of a few more farmers every day.

Fill Out and MAIL This COUPON

BABSON BROS. CO.
2843 W. 19th St., Chicago 23, Ill., Dept. 2797

Gentlemen: Please send me your Free Book describing the Surge System of milking cows.

Name_____

Address_____

State_____

"I milk_____ cows."
(number)

Surge
SYSTEM of MILKING COWS

BABSON BROS. CO., Chicago

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SYRACUSE • HOUSTON • LOS ANGELES • KANSAS CITY
TORONTO • ATLANTA • SEATTLE • MINNEAPOLIS

COMING IN WINTER

WINTER is traditionally the farmer's time to catch up on his reading and planning. The Winter issue of *Farm Quarterly* will be literally a plan book. There will be stories on new crops, new ways of maintaining soil fertility and specific information on many problems such as the perennial one, the landlord tenant relationship.

Down in eastern Tennessee Wayne Smith decided that since he had typical Tennessee hill land his corn raising should be worked out to fit his own steep fields. How he grows 150 bushels of corn an acre should prove valuable to other corn farmers. By planning their fertilizing and cultivating they can grow more corn per acre and cut down their labor requirements.

A new trend in feeding minerals is evaluated by an authority, Professor Joel S. Coffey, of the Ohio State University.

The Organic Farming people say you don't need chemical fertilizer and that from your compost pile you can get all the nutrients your soil needs. This is the complete story on composting.

Whether you like Co-ops depends upon which side of the fence you work on. The *Farm Quarterly* avoids taking sides but gives you the facts about how a typical progressive Co-op works for farmers.

There are crop stories on Fescue, the new long season pasture grass, and the Multiflora Rose, the flower that grows into fence that even a goat can't get through.

For stockmen there are stories on the inside of a cow's rumen and what scientists are discovering about the use of cheap feeds to fatten feeders. There is an amusing story on cow's brassieres which is no laughing matter to the dairyman who has to lose sleep on cold winter nights doctoring cattle troubled with mastitis. A complete story on guinea fowl is going to be informative reading for people interested in raising poultry. Sheep men will get some new wrinkles out of Richard Miller's "early lambing" story.

Pull your chair up by the fire and take off your shoes. We think you will want to spend the evening reading.

THE FARM QUARTERLY

22 East 12th St., Cincinnati 10, Ohio

R. J. McGinnis.....**Editor**
Fred Knoop.....**Executive Editor**
Grant Cannon.....**Managing Editor**
George Laycock.....**Associate Editor**
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Contributing Editors: **B. G. DeWeese, Ray Dunn, Robert Graham, Myron S. Hazen, Ralph Kenney, B. J. Killham, Charles Krutch, C. M. Long, J. E. McClintock, Banner Bill Morgan, Virgil Overholt, Charles A. Reese, Dave Roberts, G. W. Salisbury, George D. Scarseth, J. W. Schwab, Katharine A. Smith.**

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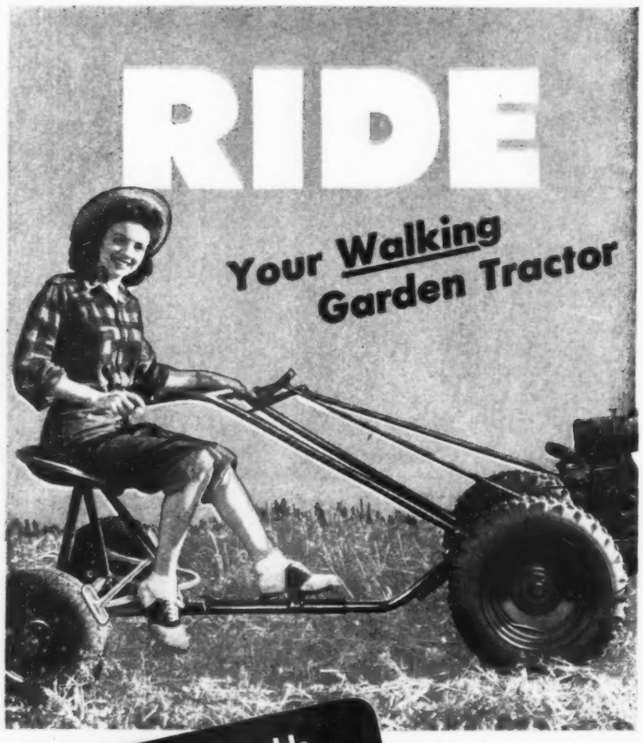
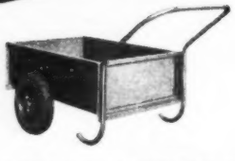


Get a Comfortable
DANDY BOY
Riding Sulky

DON'T WALK when you can ride! This new Dandy Boy Riding Sulky takes you off your feet — puts you in a comfortable seat over two cushiony rubber-tired wheels. Wherever your tractor goes, you ride in comfort . . . in style . . . with controls within easy reach. Be one of the first to enjoy this new Dandy Boy Riding Sulky!

Get one of the new Dandy Boy Dump Carts, too. Users say "it's the handiest thing on the place." Haul wood, shrubs, sod, garden tools, transplants, crates or baskets. All steel. Removable gates. Convenient seat and foot rests. See your dealer NOW!

Enjoy This Convenient
DANDY BOY
Dump Cart



A tubular steel handle is furnished with each unit so it can also be used as a push cart.

SPECIAL COMBINATION OFFER!

So many people want *both* the Dandy Boy Riding Sulky and Dandy Boy Dump Cart that a special combination deal is now available. You can save 30% by ordering Deal No. 125, because you need only *one* set of wheels for both outfits. It takes only a few minutes to switch from the sulky seat to the dump cart and back again. Whether you want the riding sulky, the dump cart, or both — see your garden tractor dealer NOW. He can give you immediate delivery. Put these easy-riding attachments to use in your yard and garden. Save time. Save work. Get extra pleasure—and extra use out of your garden tractor! Complete literature on request.

See your Garden Tractor Dealer or Write Direct to

THE MIDLAND CO.
SOUTH MILWAUKEE, WISCONSIN

LETTERS

GOATS ON PARK AVENUE

Sir:

My husband is a doctor and we have a lovely place in the country. On occasions the doctor had patients desperately ill who needed goat's milk but none was available.

Upon reading your article on goats, he said, "This is it! Why not have our own herd?"

We converted a large carriage barn into a model dairy, bought a herd of 53 goats, the best stock we could buy. Pretty soon the kids began to arrive.

From this point on I could write a book. Kids all over the place, even in the house, gallons of milk in the milk cooler, cheese in cheese cloth hanging all around the cellar, the ice box full of goat milk butter.

Never mind the $14,000 spent to get it. The result of all this has accidently put me into a most unique business.

Using an old family recipe for home-made bread, I used goat's milk instead of cow's milk. A friend ate it and said it was the most delicious bread he ever tasted. He asked if he could take a loaf back to New York on Monday. I never dreamed of what was in store for me. He took it to Macy's; they sent it to their bureau of standards and the report came back; best loaf of bread they ever tested. Of course it should have been, made with honey, butter, fresh eggs and the magic touch, goat's milk.

From this point on I have been in a whirl: today this bread is a sell-out. We are in 87 large stores in New Jersey, three department stores, Bambergers, Gimbels, and Macy's. And last week we started to serve in addition to these the Gristede stores in New York. The commentators speak of it on the air. The food editors are writing about it, and the fan mail I get is really something.

ELIZABETH C. BAGG,
Lone Oak Farm,
Basking Ridge, N. J.

OUR JUVENILE FANS

Sir:

I am a 4-H girl 11 years old. I had two Hereford steers which I took to the Junior Livestock Show in San Francisco, California. They graded prime and choice. I would like to see something about show stock in your magazine. My father and I enjoy your *Farm Quarterly* very much.

JULIE WOOD,
Box 463,
Rio Vista, Calif.

THE FOREIGN TOUCH

Sir:

You might be interested to know that *Farm Quarterly* really gets around. I received a letter from a German man in the U. S. zone in Germany. He saw my picture, sexing chicks, in your magazine and as my name and address were there he wrote and asked me to send him a tooth brush. I wouldn't have been more surprised if he had asked for a suit of clothes.

MRS. RUBY SEBREE,
McLeansboro, Ill.

Have patience, you'll hear from him again.—Ed.

THE COW IN THE OINTMENT

Sir:

Having finally found time to look through the new issue of the *Farm Quarterly* I became quite disgusted with the type of livestock pictures you use. Your cover (Spring 1948) had a very beautiful setting for a nice herd of beef cattle but did you picture them? No! You simply pictured a couple of cow brutes that don't possess any beef type nor any beauty.

CHARLES W. LUNDGREN,
Magnolia, Illinois

BOOK REVIEWS COMING SOON

Sir:

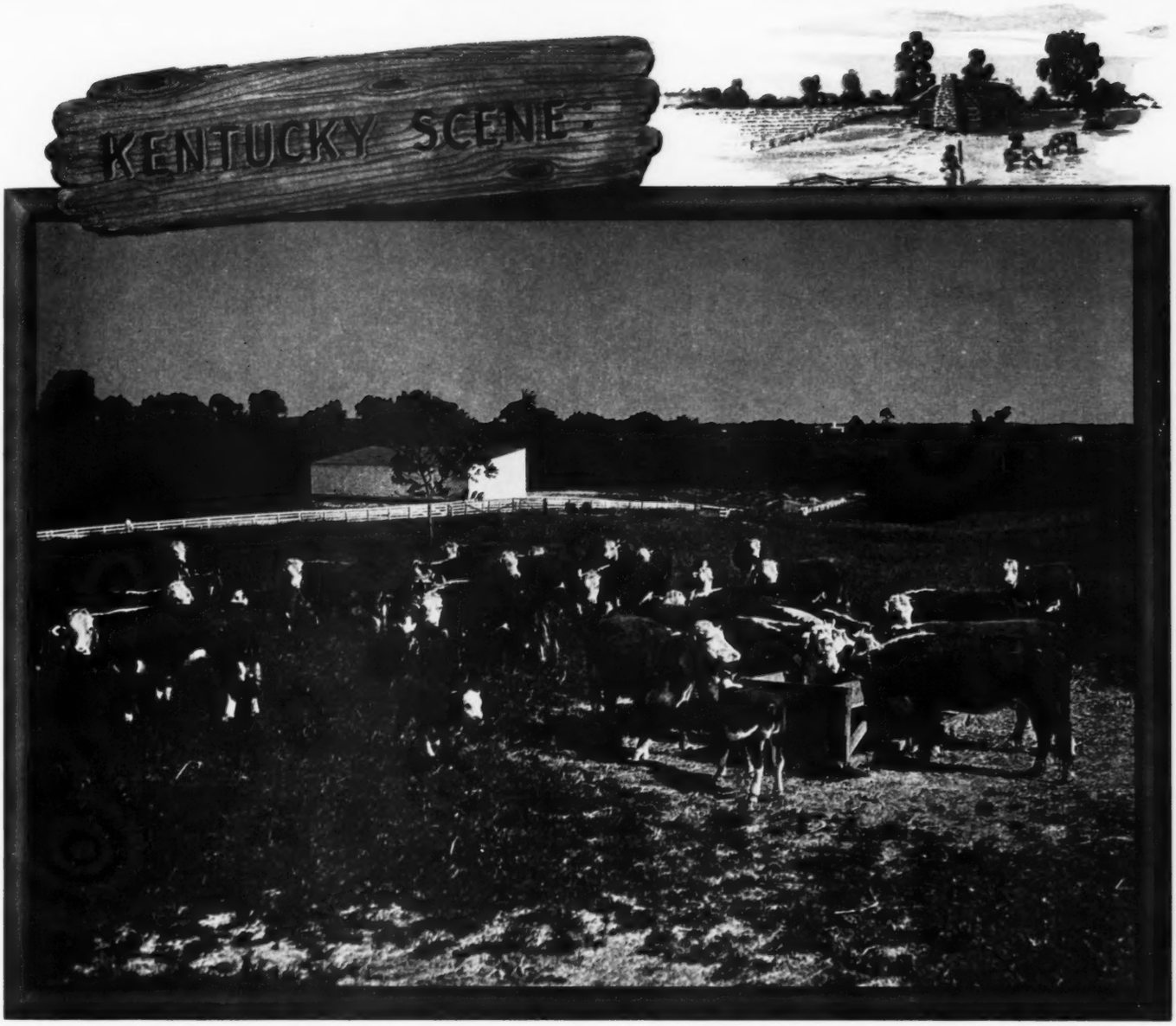
May I say that I consider your magazine the finest in its field. It may seem inconsistent to praise your work one minute and criticise it the next. Perhaps since it is constructive rather than destructive in nature, it will be accepted in the spirit in which it is given.

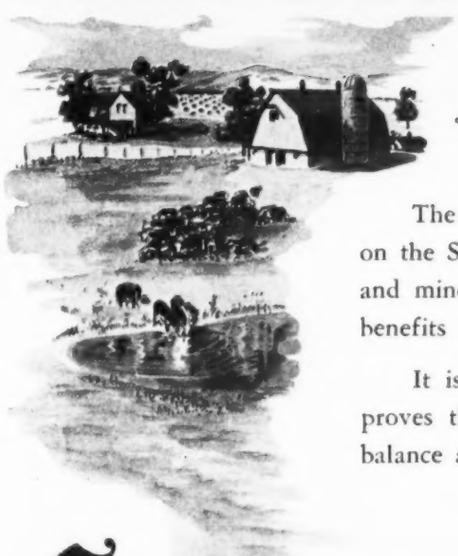
I have wondered why you do not have a literary department. I had a book on farming published last spring. It would have pleased me very much to have had it reviewed in your magazine. Probably that is the real reason that I regret your lack of a book department.

MRS. RICHARD F. HERNDON,
Springfield, Ill.

Farm Quarterly will soon add several departments, as well as more pages. One of the new departments will review new farm books. Will your publishers send us a review copy, Mrs. Herndon?—Ed.

(Continued on page 14)





Research IN PROGRESS

The results of nutrition research based on many farm "scenes" such as this one on the Seagram Nutrition Farm near Louisville, Kentucky, show that protein, vitamin, and mineral supplements improve all basic livestock rations, with definite resulting benefits to health, production, and market profits.

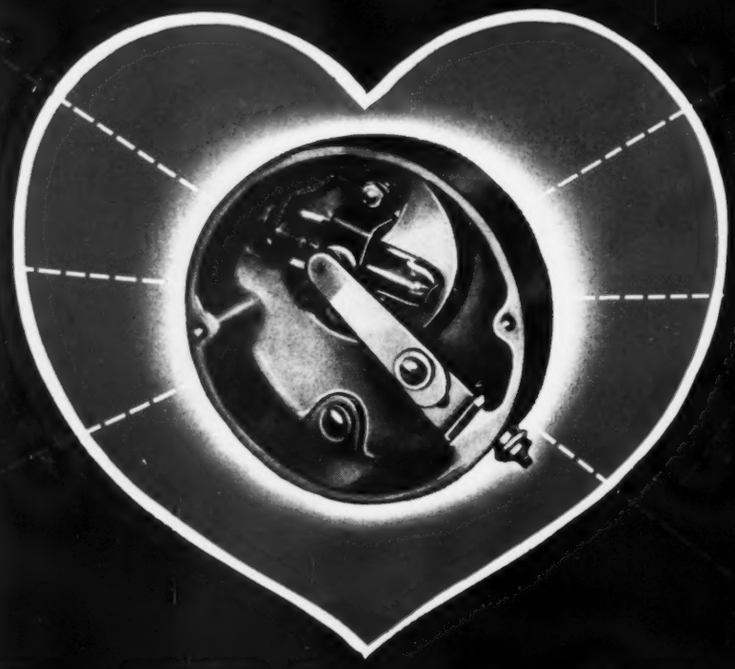
It is such information, developed from both "test" and "practice" feeding, that proves the worth of Seagram Dried Grains and Dried Solubles as supplements to balance all farm livestock rations.

JOSEPH E. SEAGRAM & SONS, INC.

GRAIN PRODUCTS DIVISION • BOX 240, LOUISVILLE 1, KENTUCKY

Seagram SERVICE TO AGRICULTURE

THIS "MAGNETIC HEART"



BEATS OUT EXTRA PROFITS!

- Only De Laval Can Give You the Magnetic Milker
- Only the Magnetic Milker Can Give You Uniform Milking
- Only Uniform Milking Can Give You Highest Milk Production

Now's the time for You to change to THE NEW DE LAVAL!

New De Laval Magnetic Speedway Milker

De Laval engineered for still better, faster, cleaner milking. New stainless steel unit and Pulso-Pump.

New De Laval Sterling Milker

Another great new De Laval Milker for still better milking at lower cost. New from stainless steel units to pump.

New De Laval World's Standard Series Separators

The cleanest skimming, easiest-to-clean separators ever built. Every part milk touches is stainless steel.

New De Laval Speedway Food Freezers

For better food preservation and better farm living. Improved table fare at lower cost. Beautiful in appearance—dependable and economical in operation.

New De Laval Speedway Water Heater

De Laval engineered for the dairyman. Supplies 12 full gallons of 185° water. "Lifetime" copper tank.

New De Laval Speedway Vacuum Can Hoist

Takes the work out of loading and unloading the milk cooler. Operates on 10 inches of vacuum supplied by milker pump.

De Laval

THE DE LAVAL SEPARATOR COMPANY

165 Broadway, New York 6 • 427 Randolph St., Chicago 6 • 61 Beale St., San Francisco 5

The De Laval Separator Company, Dept. 12-M
165 Broadway, New York 6, N. Y.

Please send me printed matter on:

- ☐ De Laval Milkers
- ☐ De Laval Separators
- ☐ De Laval Freezers
- ☐ De Laval Water Heaters
- ☐ De Laval Milking Truck
- ☐ De Laval Can Hoist

Name_____

Town_____ RFD_____ State_____

1. **12 Blue Ribbons; Reserve Gr. Ch.** 3 Jr. Championships out of his 16 1947 Ind. State Fair entries . . . were taken by A. C. Ogden, top-rate OIC breeder of North Manchester, Indiana.

2. **"Tubby", 1st Place Shorthorn Steer** in Jr. Yearling Class at 1947 International, shown by Donald Moody, Lovington, Ill., who, with his Dad, follows the Wayne Way with all their stock.

3. **Gr. Champion Shropshire Ram and Ewe,** 1947 International Livestock Show, raised the Wayne Way by F. M. Schultz, Maplewood, Ohio, who says, "Wayne certainly does the job right in feeding sheep."

4. **1947 Reserve All-American Yearling.** Neeljte Fobes Machtilde, raised the Wayne Way on Wayne Calf Pellets by Donald Plote, Elgin, Ill., who marked up many wins with his Holstein heifer.

5. **485 Lb. Litter at 56 Days.** This Yorkshire sow farrowed 17 pigs, weaned 15, at the Famous Curtiss Candy Farms of No. Illinois, where approx. 10,000 hogs are raised yearly the Wayne Way.

6. **ElJon Eric, Grand Champion Bull** at the 5th Annual National Angus Show, Chicago, shown by Elliot Brown, of El-Jon Farms, Rose Hill, Iowa, who says he finds Wayne Feeds "built to do a superior job".

7. **$3,000 "Winner's Glory"** Champion Hampshire Boar, Ohio State Fair; Best Type, Ohio State Univ. National Type Conference. Wayne-fed by Erwin and Walter Gebhart, Germantown, Ohio.

8. **"Oastie Inkarnation Bussie",** a National Dairy Show Grand Champion, one of 240 pure-bred Holsteins in the Hawthorn Farms herd, Libertyville, Ill. Herd averages over 400 lbs. fat.

Parade of Top Performers

TYPICAL WAYNE-FED WINNERS IN SHOW-RING...CONTEST...FEED LOT...MARKET-PLACE

9. **Michigan's "Chicken of Tomorrow"** 1st & 2nd, 1946; 1st & 3rd, 1947; Lloyd Tice, Tice Htchy. & Pltry. Farm, Barryton, averaged 5.2 lbs. at 14 weeks, 4.3 lbs. dressed wt. with his Barred Rocks.

10. **Champion Hampshire Ewe,** 1946 International Livestock Exposition. Har Mar Betty Boots, owned by Harmon Harper, Cromwell, Indiana, won 22 out of 23 showings. Harper says, "It's Wayne for real results!"

11. **94,371 Lbs. Milk, 3,897.2 Lbs. Fat** in 5 lactations. Lauxmont Admiral Primrose, and the entire high-producing herd of Martin Buth, Jr., Comstock Park, Mich., has long been fed the Wayne Way.

12. **World's Record Laying Pen.** Bred by Mosher Ped. Leghorn Farm, S. Dayton, N. Y. Started, grown, prepared for contest the Wayne Way, they set official record (4 yr.) of 827.5 eggs each.

YEAR AFTER YEAR . . . THE *Wayne Way* PAYS!

Nationally-known poultry and livestock feeders have proved it. Countless local, state, regional and national records have proved it. *Your own results and experience*—in show-ring or feed-lot—will prove it. See your friendly Wayne Feed Dealer now for full details . . or send coupon below.

Allied Mills, Inc., Ft. Wayne 1, Ind.

Send free feeding information on

Chickens ☐ Turkeys ☐ Calves ☐

Hogs ☐ Dairy Cows ☐ Beef Cattle ☐

Name _____

Address _____

Back of every successful livestock enterprise is a sound feeding program

WAYNE FEEDS

Ford

TRACTOR

"GIVES ME THE POWER I NEED ...and saves me money, too!"

"When I'm on this Ford Tractor, the thing I like is its power . . . the way it pulls . . . gets things done.

"When I'm checking over my bills, the thing I like is the *economy* of my Ford Tractor . . . how little I pay for gas and oil and repairs.

"Yes sir, my Ford Tractor gives me surprising power, and without a lot of unnecessary weight. I like that ...makes it easy to handle...means lower operating cost.

"I don't have to tell you that when you are breaking sod or discing deep, you need 'more tractor' than when you're just mowing or using a cultivator.

"That's why I like the Ford Tractor . . . it has the right combination of power and weight and speed for every job I do all the year 'round. To me that's the test of a tractor . . . how it performs in both heavy and light work. Yes sir, this tractor gives me the power I need . . . and saves me money too."*

* * *

Ask your Ford Tractor dealer to show you these advantages . . . and the many others . . . of the Ford Tractor. He will gladly talk over your particular farming problems and point out the features of the Ford Tractor that will be especially valuable to you.

DEARBORN MOTORS CORPORATION • DETROIT 3, MICHIGAN

*Statement of Ford Tractor owner, name on request.

The only time that Counts is Working Time

PLENTY OF POWER FOR HEAVY JOBS

PLOWING. The Ford Tractor is powered to handle a two bottom 14-inch moldboard plow . . . also disc plows, middlebusters, 2-way plows, furrowers, field cultivators and sub-soilers.

PICKING CORN. The Ford Tractor and the Dearborn-Wood Bros. Corn Picker . . . a fast, clean-picking, dependable combination! Picks narrow rows as well as wide rows; big husking bed.

MOVING DIRT. Moving dirt, manure, etc., is easier with the Ford Tractor's power, hydraulic touch control, and Dearborn blades, dozers, scrapers, levers, scoops and loaders.

SPEED AND ECONOMY FOR LIGHT JOBS, TOO

CULTIVATING. Speed and handling ease of the Ford Tractor make cultivating go quickly and economically. Attaching or detaching in one minute speeds changing to mower or other implements.

MOWING. Here again you get speed and economy with the Ford Tractor and Dearborn Mowers. 25 to 35 acres a day are common. Rear-attached mower attaches quickly, you make full use of good weather.

HAULING. Between field and barn, or on the road, the Ford Tractor with new high speed fourth gear and a Dearborn Wagon give you the kind of speedy and economical hauling you'll like.

Dearborn

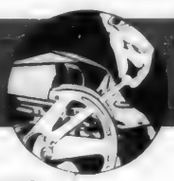
FARM EQUIPMENT

See Your Dealer

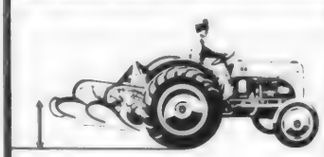
Your nearby Ford Tractor dealer is headquarters for Ford Tractors, Dearborn Implements, genuine Ford Tractor parts and for implement and tractor service second to none. Ask him for a demonstration of the many advantages of the Ford Tractor and Dearborn Farm Equipment.

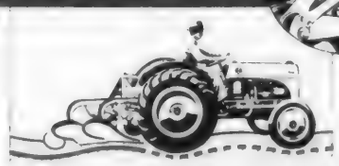
Only The Ford Tractor Gives You

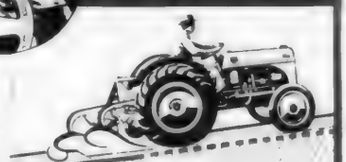
THESE 3 BIG ADVANTAGES



WITH FORD HYDRAULIC TOUCH CONTROL







LIFTS AND LOWERS AT A TOUCH - You can lift and lower most Dearborn Implements simply by moving the hydraulic lever. This feature will save you time and work dozens of times a day. When going to and from the field . . . when turning at row ends . . . when crossing grassed waterways, or backing into tight corners. No stiff awkward levers to set, no rope controls to pull.

UNIFORM DEPTH CONTROL – *Under practically all plowing conditions, the Ford Tractor gives you Uniform Depth Control in three ways:*

1. In fields that are ridged or uneven and where the soil conditions do not vary, you merely set the Touch Control Lever and uniform plowing depth is maintained automatically.

2. In fields that are ridged or uneven and where the soil conditions vary, you merely operate the Touch Control Lever to maintain the plowing depth you want.

3. In fields that are reasonably smooth, whether flat or on hillsides, regardless of whether or not the soil conditions vary, you use a great new Ford feature called Implement Position Control. Just set the Touch Control Lever once and uniform plowing depth is maintained automatically. Helps you save time and work and do a better job in the bargain.

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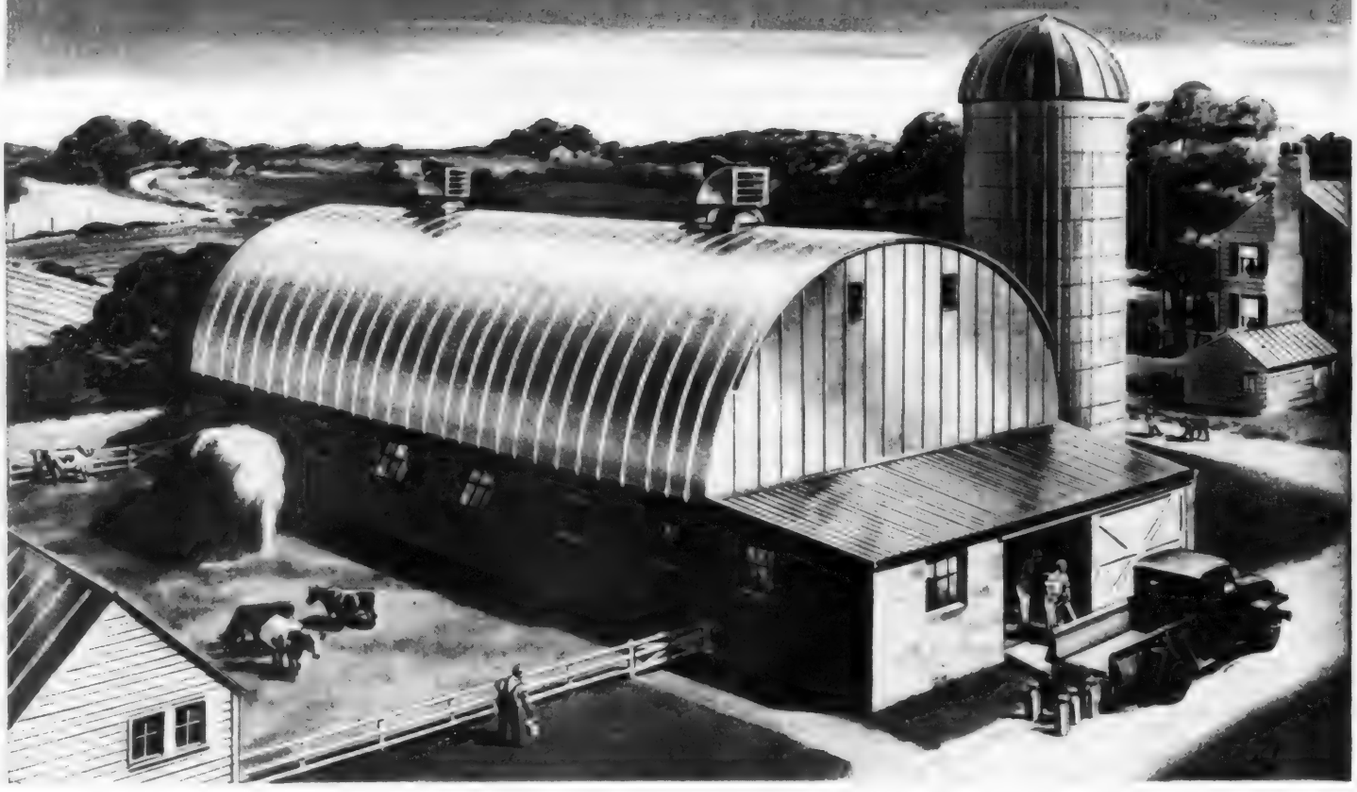
Ford Farming MEANS LESS WORK... MORE INCOME PER ACRE

ALUMI-DROME



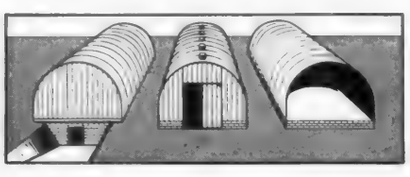
Now...with *Lifetime* Aluminum...Reynolds perfects the ready-to-assemble farm building

Immediate Delivery
The Entire Structure Complete in one Shipment . . . with instructions!
Assembly in about 96 Man-Hours!

Here at last is the most economical, most adaptable and quickest assembled type of building . . . *with the permanence of aluminum!* Rustproof aluminum that needs no painting . . . fire resistant, rat-proof, termite-proof. Aluminum that reflects up to 95% of radiant heat . . . throwing off the sun load so you step inside on a hot day and actually cool off . . . keeping winter heat in, too!

The Alumi-Drome is new, unique. Its basic versatility was proved from Europe to the South Pacific. But this is a sensational advancement. 100% Lifetime Aluminum. Patented all-bolt assembly. No holes in the heavy-gauge, rigid-embossed sheets. No exposed edges to catch wind. No nails to rust or work loose. No caulking. No tarring of seams. The Alumi-Drome is permanently weathertight!

Basic unit is 36′ x 60′, length variable by 6′ sections . . . all clear space, no posts or trusses. Whatever building you need, you owe it to yourself to consider and compare Reynolds Alumi-Drome. Write today for detailed literature. **Reynolds Metals Company, Alumi-Drome Div., Louisville 1, Ky.**



Various arrangements of doors, windows. Endless adaptations for Cattle Barn, Crop Storage, Machine Shop, Implement Shed, etc.
Eligible for FHA financing.

REYNOLDS METALS

There's a Lot of Tomorrow

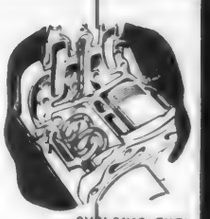
in Today's JOHN DEERE TRACTORS

TODAY—in a great line of tractors—John Deere is setting the pattern for tomorrow's farm power.

There's a new *get-up-and-go* to provide the extra power you've always wanted to match your heaviest jobs, to speed up every job and save time. There's effortless, finger-tip control to raise and lower drawn or mounted implements, to change their operating position instantly for best work. There's a new freedom in steering, a new smoothness over rough ground that eliminates wheel-tug and greatly reduces fatigue. There's a new ease of attaching and detaching cultivators and many other mounted implements that cuts change-over time.

These are just a few of tomorrow's advantages you can enjoy *today* in a John Deere—advantages made possible by advanced engineering. Add to them the outstanding economy, the rugged dependability of exclusive John Deere *two-cylinder* design with its fewer, heavier parts . . . the quality construction that is typical of John Deere . . . and you'll understand why John Deere Tractors are *first* in *modern* design and *proved* performance.

JOHN DEERE *Moline, Illinois*

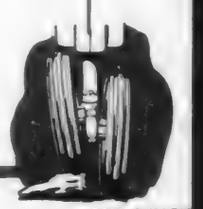


CYCLONIC-FUEL INTAKE ENGINES

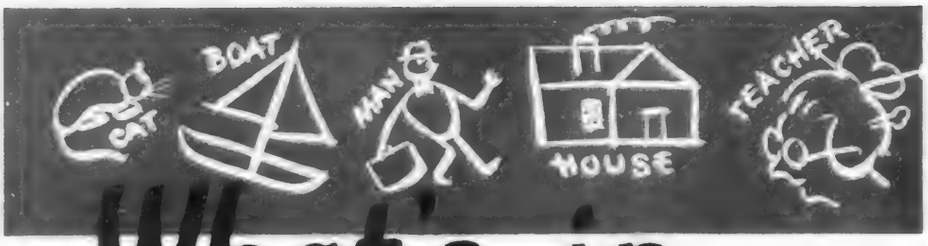
HYDRAULIC POWR-TROL

TOUCH-O-MATIC CONTROL

QUIK-TATCH EQUIPMENT



ROLL-O-MATIC KNEE-ACTION FRONT WHEE



What's in a NAME?

A name is a convenient tag but things can exist without names.

For example, there are in B-F Super Solubles unknown factors as yet unnamed in the laboratory's test tubes, but revealed by experimental feeding. Until science gives them a specific name, we refer to them as "vital productive factors," for their presence in the diet has produced results in fleshing and settling above and beyond what can reasonably be credited to the true vitamin A, vitamin D, the B-group vitamins, or the many other known components of the B-F Super Solubles Beef Supplement.

Ed. Note: We said that a name, when available, is a convenient tag. The name BROWN-FORMAN, represented by the B-F on the sack, in the past 78 years has come to mean: QUALITY and UNIFORMITY

Write

FEED DIVISION
BROWN-FORMAN
DISTILLERS CORPORATION
at
LOUISVILLE IN KENTUCKY

PROVIDES

true VITAMIN A
VITAMIN D

B-GROUP VITAMINS
RIBOFLAVIN, THIAMIN NIACIN, CHOLINE, PYRIDOXINE PANTOTHENIC ACID, p-AMINOBENZOIC ACID BIOTIN, FOLIC ACID

FATS and PROTEINS
CALCIUM, PHOSPHOROUS
and ESSENTIAL TRACE MINERALS

plus VITAL PRODUCTIVE FACTORS

SAVE LABOR

with MULKEY'S *NEW* Improved* (5½ in. Straight-Sided) All-Steel
PORTABLE* BALANCED ELEVATOR
for
• EAR CORN
• Baled Hay, Etc.

17½ ft. Maximum Lift 24 ft. Long

8' Standard or Reverse-Action Hopper Available

★ One man can handle and operate.
★ New winch assembly easily raises elevator.
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Write for FREE Literature and Prices

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WOULD YOUR PLACE BE SAFE?

• Lightning causes 3 out of 8 farm fire losses—7 times as many as spontaneous combustion. Yet lightning never has destroyed any building fully protected by Security System. It is designed to PREVENT lightning strokes. It guards against induction danger in water systems, wiring, air ducts. Security has been protecting farms, schools, churches for 75 years. Find out now about this life-time protection. Security Mfg. & Contracting Co., Burlington 5, Wisconsin.

SECURITY
LIGHTNING PROTECTION IN THE MODERN MANNER

LETTERS

(Continued from page 6)

FLYING MACHINES AND PSYLLIDS

Sir:

Your article "Planes on the Farm" is most timely and informative. I was especially interested because those "flying machines" are beginning to revolutionize some phases of farming in our irrigated valley. So far, their chief use has been confined to dusting field crops for insect pests. During the summer months, Piper Cubs, Pt 17 Stearmans (converted Army training planes) and N3N's (converted Navy training planes) are often our 4 o'clock alarm clocks. Since their working hours must be windless, their hedgehopping work is done at dawn and dusk. A wind velocity of more than 5 miles an hour ends dusting operations.

They zoom low (4 to 8 feet above the ground) over the potato fields, trailed by heavy clouds of lethal dust which settles with suffocating effects around psyllids, flea beetles and leaf hoppers alike. Psyllids (silly "sillids" I call them), are almost microscopic colorless insects which cling by sucking mouths to the underneath surface of the potato leaves. Their affect on a potato vine is most toxic and if psyllids are not destroyed leave the vines purple top or psyllid yellows.

In the eastern part of Nebraska where large corn fields are common, planes have been used to spray young weedy corn with 2,4-D. Eleven planes are now equipped to spray with 2,4-D in Nebraska alone. *The Nebraska Farmer* says, "This revolutionary attack on weeds with 2, 4-D is causing more talk than the advent of the plow."

MRS. JACK BRASHEAR,
Scottsbluff, Nebr.

For an article on 2, 4-D see page 58.

BORING FROM WITHIN

Sir:

We have been most enthusiastic about *Farm Quarterly*, and now liquor advertising rears its ugly head. To be sure, the distillers make it all look *very* beneficial to the farmer. Insidious danger is the most dangerous danger. If, for all the damage liquor does, it paid its own way, we might tolerate it. But we might just as well look the issue squarely in the eye and eliminate it.

MRS. HAROLD L. DOWNER,
Lounsberry, N. Y.

Ever try a bender on Distillers grain?—Ed.

MULE GENETICS

Sir:

In your article "Livery & Feed" (Summer 1948) in the next to the last paragraph speaking of the two Jacks, you state that their offspring was "sexless".

That statement in itself is quite misleading and needs explanation.

I believe what you intended to get across was that the offspring of a jack-mare mating was *sterile* instead of *sexless*.

Now this is true in most cases but occasionally a mare mule is fertile and will foal after being bred.

It should be explained that the female mate to a jack is a jennet.

A jack will breed either a jennet or a mare. The offspring of the jack-jennet mating being another jack or jennet, and both fertile.

The offspring of a jack-mare mating is a hybrid, of either sex, but sterile, and called a mule.

The offspring of a stallion-jennet mating is called a hinny and may be of either sex and in most cases sterile. This cross produces such an undesirable animal that it is not practiced.

LELAND D. SLYGH,
Toulon, Illinois

To a mule skinner they're all ornery.—Ed.

Out in Front

Looking ahead, we see one fundamental truth.

What America needs is more for its money. If the dollar keeps on buying less and less, our gold will soon turn to straw.

We say that, today more than ever, *quality* and *full value* must be the guiding principles of commerce.

Can they prevail in the face of inflated costs?

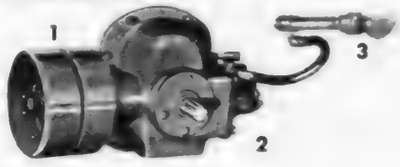
Our answer is here on this page: two FULL-SIZED REAL FARM TRACTORS at sensible prices. They are the 1-row Model B and the 2-row Model C, complete with 3-in-1 Power Transmitter, hydraulic system, electric lights and starter. PLUS—a full line of power implements with precision hydraulic control.

Even in these times, a full dollar's worth is the right of every purchaser. It's the only sound business formula we know.

ALLIS-CHALMERS
TRACTOR DIVISION, MILWAUKEE 1, U. S. A.

WITH FRONT-MOUNTED IMPLEMENTS

Planters, cultivators, fertilizer attachments, mower — all ahead of the driver's seat. No blind spot behind you. What a world of difference in comfort and accurate work!



1. Belt Pulley
2. Power Take-off
3. Hydraulic Lift

WITH 3-IN-1 POWER TRANSMITTER

The last word in a touch-control hydraulic system. Attachment for B and C tractors.

WITH MORE FARM POWER PER DOLLAR

THE NAVAJO FARMER'S WIFE wears the customary velvet blouse, and the turquoise and silver jewelry the Navajo craftsmen make. She helps with the construction of a new hogan. Under the smoke hole in the roof she will cook on a converted oil-drum stove with a chimney of joined lard cans. Her loom will crowd one side of the room. She helps her husband farm the desert; her children tend the sheep.

NAVAJO FARMER

BY MARY AND JOHN COLLIER, JR.

The Navajo farms the desert and herds his sheep on the eroded ranges. His home is a domed hogan, his Gods the many Sacred People. The land will not support him, but his habits and background keep him from making a living in the white man's way.

NOW Johnny Chee has been home from the Army more than two years. The joy of homecoming has been replaced by the wonder of what is going to happen to him, for unlike most Americans he is a ward of the Government.

Day breaks late this first Friday in February. In the first cold light the three Navajo hogans of Johnny Chee's family stand out like black rocks on the sage covered plain of Burnt Corn Valley. In the pole corral near the hogans a lamb is bleating, an early lamb, born out of season.

Wisps of smoke begin to rise from the smoke holes of the three hogans, silvery threads of smoke that rise unbroken in the icy morning air. Everyone is getting up. You are asleep on a sheepskin, and then you wake and sit up, rub your eyes and you are up. No clothes to change, no clothes to put on, because Navajos rarely remove their clothes at night. So Johnny Chee sits up and rubs his eyes. So do his two little brothers and his younger sister. Old Grandfather Fast Horses coughs hard and spits into the dead fire. Johnny's father, Isaac Chee, rolls a cigarette. Johnny's mother kindles the fire from the dying coals in the oil drum that serves as a stove, while his grandmother rummages about in some flour sacks to make fried bread for the early meal.

Nobody is talking much yet, just grunting and mumbling as each thinks over the tasks for the day. Grandmother sees the nearly empty flour sacks. Will someone get to the post today to get more? Old Grandfather, feeling all his aches, thinks of the times when he was a boy and would run out to greet the dawn. Yes, he would run five miles into the dawn and five miles back. That's the way it was when he was a boy. Johnny's mother thinks of the younger boys. They should be in school, but she is keeping them home to look after the sheep.

Isaac Chee, a strong, quiet, capable man in his late fifties, is thinking as all fathers must about the family finances. Should he pawn his silver belt again? The two younger boys are laughing. Teasing each other with their private jokes, they splash water from the little basin as they wash their faces. Mother starts to check them, then remembers that with snow on the ground, water is not so precious, but in a month or so they'll be hauling it four miles from the windmill. Sister gathers up the sheepskin beds and shakes them out over the rack outside the hogan. She gives a kick to shake the dust from her skirt and smoothes down her frayed velour blouse.

But Johnny is thinking hardest. All winter he has been idle, just puttering around. Fried bread and coffee are good, but not when it's all you have to eat. Where is there a job in the lonely plains of Burnt Corn Valley? Jobs are far away in Winslow, Flagstaff, or even California. His heart is heavy with the thought of leaving home.

Coffee is boiling on the oil drum stove. Mother pats a ball of dough into a tortilla and drops it into the sizzling fat. Sister spreads a cloth on the floor and passes out cups and spoons, and the family settles down for breakfast.

Old Grandfather Fast Horses spits again and begins one of his long speeches. "I suppose you've been everywhere now," he begins, nodding at Johnny. "I suppose you've traveled everywhere and seen everything. I suppose you've traveled so far that you came right to where the land went into the sky."

"No, Grandfather," Johnny explains again. "The land is always under the sky. The land is like a big melon, and I was like an ant going round and round."

Old Grandfather spits skeptically. "Ants and melons! We had much finer stories to tell when I was a boy."

"Well, Grandfather, he's back," laughs Johnny's mother, "and that's a wonderful thing. To travel as far as Johnny traveled and still get home!"

"He's home," observed grandmother tartly, "but how long will he stay home? What's the matter with all the young people today? Always running around and around like they had no home."

WITH A DIGGING STICK John Skacy digs a deep hole for his corn. His daughter counts out the grains to plant, "four for the cutworm, four for the crow, four for the beetle, and four to grow."

Johnny finishes his coffee, throws the dregs toward the fire, and gets up. "I'll go for the horses, Father; then we can go to the post. Maybe there'll be some news."

Day is under way now. The sun is well up. Johnny's married sisters and their small children are bustling about in the other hogans. The younger boys hurry off to let the sheep out. Sister goes out to milk a goat. Grandmother rattles the dirty cups. Mother gathers her weaving things together and squats down before the big loom. Outside Johnny and his father hitch up the battered wagon and start off for the trading post.

The Indian Trader

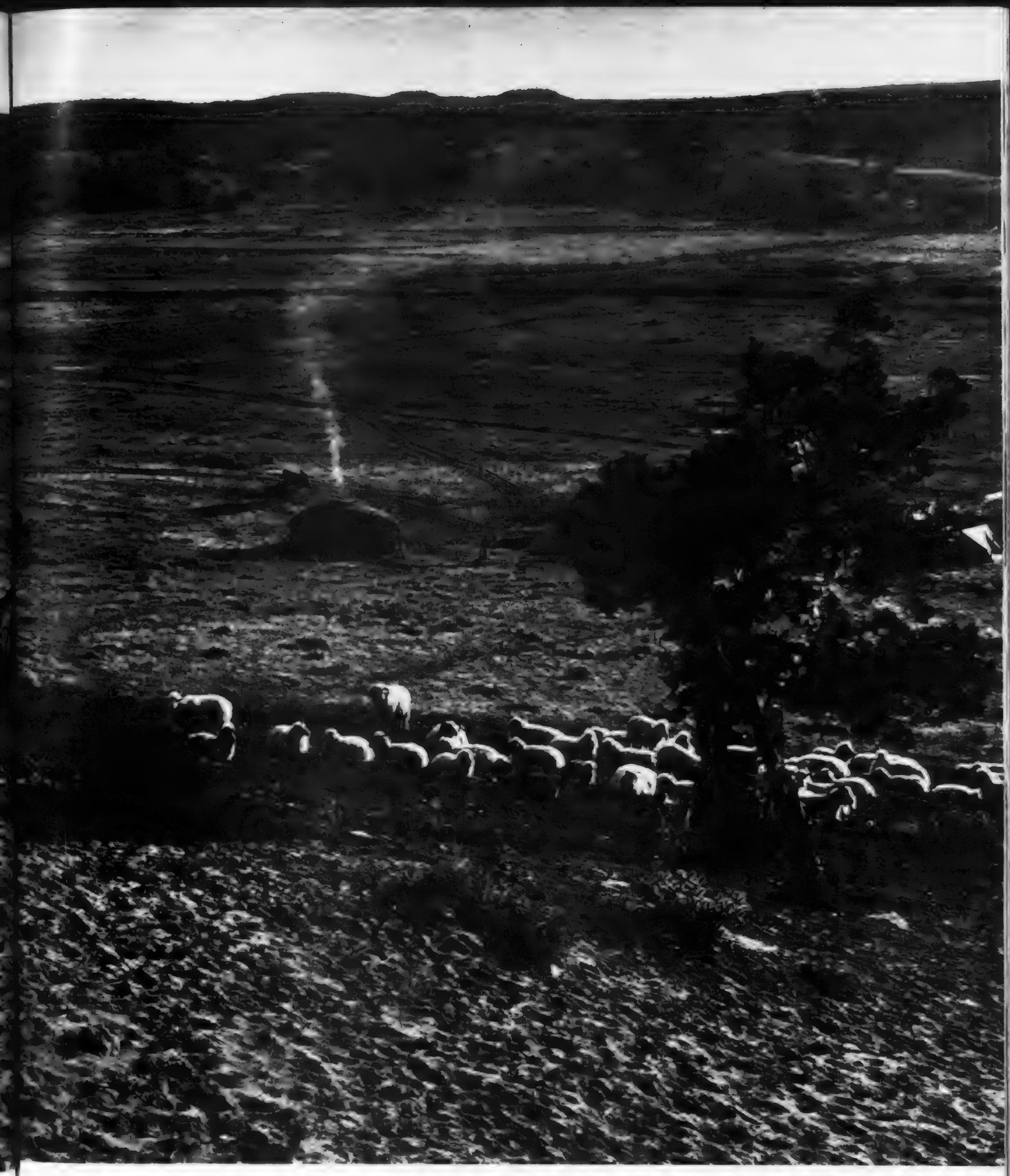
The trail to the post is two parallel ruts that runs through the sage and skirts the red mesas that wall one side of the valley. Now it dips precipitously into a wash and back up again, the horses struggling, though the wagon is empty. In the ten miles to the post they pass perhaps eight or a dozen hogans, huts of wood and earth, so much a part of the land you might not see them. Most of the way there is only the spacious vista of plains, mesas, and sky that makes up the Navajo world.

The trading post is the hub of the scattered trails leading to it from all directions. Besides the red sandstone post there is a missionary church and a government day school. There is a scattering of hogans of Indians who work in the school, in the post, or who have some obscure business of their own, an excellent medicine man, a young man who owns a truck, a blacksmith with a little forge who puts on horseshoes and fixes loose wagon wheels.

At the post wagons and saddle horses are hitched everywhere. Everyone has come to trade and hear a little news. Everyone is busy and self-contained. Some are watering their horses at the pump, others are loading bales of alfalfa for their horses, for spring grass is still a long way off. Others just stand along the wall in the sun looking wise and thoughtful. The women in their bright velveteen blouses and long full skirts push their way in or out through the heavy door of the post.

Inside, the trader stands patiently behind the counter. Navajos crowd the counter, squat against the wall, recline against the grain bags. There is a gentle hum of voices. News is going around. Fifty intent eyes sweep the shelves of the trader's store. Men look earnestly at a rack of new saddles, at coils of white lariat rope, at a new plow with a crimson painted plowshare. They look at the great, wide brimmed, tall crowned Stetson hats that swing from the rafters overhead. Their women look longingly at the bolts of velvet, royal purple, peacock blue, and burgundy red, at the many-striped Pendleton blankets that every well dressed Navajo woman must wear. Children

Indian Country



IN THE HOGAN breakfast is cooking and the pinon smoke rises from the smoke hole. Soon the children will drive the sheep off to graze. Beyond the hogan is the gulley that brings the spring run-off which gives the crops their one soaking of the summer. The white man, seeing this vast, arid country, eroded and sparsely grown, wonders why anyone would live here. But the Navajos love this land. To them each canyon, each rolling hill is part of the Navajo personality, each rock is a friend, each trail an old song.

stand in a silent circle around the candy counter, admiring each piece like a jewel from a foreign world. Then one by one the Navajos do their buying, flour, coffee, lard, and a little sugar. They buy it all very slowly, thinking about all the fine things they would like to buy, but it is the flour they finally ask for.

Isaac Chee unbuckles his great silver concha belt with smiling sky blue turquoises on each concha. He offers it to the trader for pawn. The trader makes out a pawn ticket.

"All I can offer is forty dollars. You know how things are," the trader says in Navajo, sweeping his arm toward the gleaming racks of pawn that stand just behind him. Thirty, fifty silver belts, strings and strings of turquoise, bracelets, rings, thousands of dollars worth of credit in pawn. "Look at all that! Everyone wants to borrow money. In six months the pawn is supposed to be dead, and where is the money? If I were to sell the pawn, everyone would feel bad and say I am not their friend. This concha belt was your uncle's. It has been here before. It is a fine old belt. I'll put you down for forty dollars. . . ." He enters the figure in the credit book by Isaac Chee's name where thirty odd dollars is still outstanding. "Can't you make some money, Isaac? Look, last week I heard the railroad needs section hands in San Diego, and next month the orange growers will want many men . . ."

"All this work is so far away," replies Isaac. "You know lambing time is soon and I have fine lambs coming. There will be wool in May."

"Yes, but only a handful. Your father used to have three hundred head."

"Yes," Isaac nods slowly. "I have only thirty head now. My permit allows thirty-five. Yes, it is very hard."

Johnny puffs silently at a cigarette. His father is buying his groceries now. Two sacks of flour, lard, coffee, one can of peaches for a treat. Johnny suddenly smiles. Not a smile of humor or pleasure, but a particular Navajo smile that says, "This is life. This has happened before."

"I think I will go again, Father." Johnny is saying. "San Diego." Again the smile. "What day it is?" he is asking the trader. "Will the mail bus go by here tomorrow?"

The Navajo Problem

Last winter the public "discovered" the Navajos and their privations. Clothing and food were sent from dozens of organizations. A Wisconsin housewife sent a pretty white dress "for a Navajo baby". A home economics class in Oklahoma sent ten dollars. Congress appropriated $2,000,000 for emergency relief.

Navajos have multiplied beyond the point where the arid and eroded land can support them. Far from being the vanishing American, the Navajos have increased from 8,000 in 1868 to some 61,000 today. They are trying to farm an area that will only support 20,000. This is the Navajo problem reduced to statistics.

The present crisis has long been gathering. For centuries sheep have been the basis of their economy. But between the 1880's and the 1930's the sheep increased phenomenally in response to market demands. The increasing herds close-cropped the range and the Navajo lands became disasterously eroded. Old men can remember parts of the reservation with grass so tall it rattled against the stirrups. An old Indian tells of stalking antelope, near Leupp, Arizona, by hiding in the deep grass. Today a horned toad couldn't hide in the remains of the range. In the 1930's the government instituted "stock reduction", limiting the number of sheep to the theoretical carrying capacity of the range—saving the land, but upsetting the Navajo way of life.

The day of reckoning was put off by WPA and CCC. Then came the war, and 3,600 Navajo service men were sending home their allotment checks and some 15,000 were working in defense industries and agriculture. The war's end brought the problem to a showdown. The defense workers returned to unemployment on the reservation. Then the veterans returned. By the middle of last winter the "52-20" checks were gone. Starvation stalked the reservation.

THE MEDICINE MAN and his assistants make a sand painting of the four sacred Wind People in preparation for a sing. Through chants and mystical rites they hope to influence the forces that cause rain, heal the sick or overcome disaster.

Navajo Land

The land is a vast wilderness straddling the Great Divide on the Colorado Plateau, larger than Massachusetts, Connecticut and New Hampshire combined. It is 25,000 square miles of waterless mountains, red walled canyons, plains and hills of sage brush, piñon and cedar, stretching across eastern Arizona, western New Mexico and a part of southern Utah. In the lower altitude to the west the land is a desert waste. The middle plains are covered with sage and the hills with cedar and piñon. The higher mountains and mesas support scrub oak, stunted aspens and the ponderosa pine. The average rainfall is eight or nine inches a year, coming mostly in summer downpours. Subzero winter nights, drying winds and sandstorms through the spring, intense summer heat with violent thunderstorms and flash floods—this is the round of seasons through which the Navajos must raise their corn, herd their sheep, and live out the pattern of their lives.

Why should a vigorous expanding people want to live in such a land? This area has always been their home. In its severity it spells trust and peace. Each canyon, each rolling hill, is part of the Navajo personality; each rock is a friend, each trail an old song that fills the heart with strength. The land was not always desert. In the old days there was plentiful game, enough grass, and above all there was space for a free spirit, for flocks of fine sheep, for rich living. The Navajos' love of their land permeates their whole approach to life. This land between the four sacred mountains is the center of the Navajo universe, and who would want to live elsewhere?

Religion

The basis of Navajo religious thought is that the universe and all the earth people

WATER IS HAULED for miles in the summer. In this country few springs or streams flow the year 'round and even the deep wells may go dry. The Indians sun their clothes and bedding rather than wash them since little water can be spared for personal cleanliness.

function according to rules. The misfortunes of sickness and premature death are the result of not following the rules. Navajos hold ceremonials to restore order in the individual by performing exact rituals which will require supernatural forces to withdraw their punishment, or the sickness, from the individual. To be well you must obey the ancient rules, and the chants and ceremonies are routines to re-establish the broken pattern.

Navajos have no glorious image of after life, so they are principally concerned with living long and well. They seek harmony within the individual, or between the individual and supernatural powers.

Navajo ceremonials are primarily directed against sickness, physical or psychic, and involve exact chants or "sings" that last from a day to nine days, depending on the seriousness of the illness and the wealth of the patient. Nothing is done for nothing in Navajo religious therapy, and the fee of the chanter may be as little as five dollars or as much as five hundred, according to his skill and prestige and the nature of the ceremony itself. A "sing" may be an intimate family affair or an elaborate social occasion with a thousand people attending. The chanting follows an inflexible pattern of ritual, repeating or re-enacting an episode from the life of their gods, the Holy People, who are capable of both good and evil.

In the government's community school at Navajo Mountain the young pupils had been through a siege of colds that defied medication. The hacking coughs and dry irritated throats kept the children awake

nights. A medicine man came to the white teacher and suggested that they should have a sing for all the children to get rid of the coughing. The teacher, who valued the cooperation of this influential man, agreed and the sing was held in the school building. The chanting itself was a traditional ritual, but along with the ceremony the medicine man said: "Now, we all love to sing. We have a song for every task of the day. And to make the beautiful songs we must have beautiful throats. See," he stroked his own throat, "our throats are one of the finest things we have. All that we say that is beautiful must come through our throat. If we keep sniffing and coughing and growling there will be no beautiful singing, no fine thoughts. Our spirits will be bottled up." There was not a sniff or a cough in the room. Each child was feeling his throat with new respect and concern. And then the man went on with his chanting.

At another time there was a little orphan boy in the school who continually wet his bed, much to his embarrassment and the teacher's dispair. "What do you people generally do about this sort of thing?" she asked some Navajo mothers. "Oh, that is nothing. We cure that all the time," they told her. So again the medicine man was summoned.

"Yes," said the old man, "I can cure the little boy. First I must have four birds' nests." It was winter and nests were hard to find, but the children scoured the hills till they found them. Now the medicine man was ready to chant, but first he talked to the children. "Now, everyone knows that urination is a good thing. It takes bad things out of us and makes us feel good. But we only urinate in special places. We go outside. We go where other people are not. To urinate in the hogan or on blankets and clothes is a bad thing. Right from the start we must learn the right way. This little boy is having some trouble about it. He is one of you and you must all help him in his trouble. We are all here to help him: we are thinking about his doing the right way." Then the old man began to chant of the Holy People. After the chanting he had the little boy urinate in each of the four bird's nests, and then the nests were burned. The boy, by record, never wet his bed again.

Through their sings the Navajos attack their problems in a positive way which achieves a tremendous psychological impact. Your relatives and friends are all there to help you, giving you their undivided will and attention. Someone has paid good money to have the medicine man come. All this attention is a great support to the will, and songs can accomplish a great deal of good.

The Hogan

The Navajos mystic outlook carries over into their material life. Their dwelling, the hogan, a domed wooden structure plastered with mud, symbolizes protection, peace and good luck for the family and the guests who seek hospitality. There are some rules of hogan design that are rarely broken. The door must face east. There shouldn't be a window toward the north for that is where the dead people live and they might return and spy on the family within. There should be a hole in the roof for the escape of evil spirits—and smoke. The floor plan should be approximately round, symbolic of the sun, the fire in the center represents a captured portion of the sun's light and heat.

Outside, the hogan looks like a little log and mud hovel. But inside the single room seems relatively spacious. Ample light streams through the smoke hole on to the stove below with its makeshift stovepipe of joined lard cans. Around the walls are the family's possessions, packed away in trunks, in bundles hanging from the ceiling, clothes folded or hanging from nails. And there will be little personal things, pictures cut from magazines, toys the children have made, drawings they made in school or, an abalone shell a veteran son sent from the Pacific.

On cold winter days the hogan is apt to be crowded, the loom taking up one whole side, idle men playing cards all afternoon, little children underfoot. As the days begin to get warm the family moves outside for most of its activities. Poles and brush form a summer shelter to break the west wind and provide shade from the noonday sun. A family usually has several of these extra "rooms."

ROBERT TALLSALT was a Marine Corps "talker" in the Pacific, transmitting top-secret messages in the Navajo language to a tribesman who decoded them. The Japanese were never able to break this "code." Here he reads to his daughters from a newspaper printed in the new, written Navajo.

It Is All Food

Traditional Navajo foods are the direct product of the land. In the old days mutton and goat meat from the family herd was the base of the diet, and there was corn, squash, beans, and melons that the family raised by dry farming or got through trading with the Hopi farmers. Navajos learned to use every part of the animal and plant, and as a result the old diet was remarkably well balanced.

The Navajos eat all the internal organs and entrails. They empty and wash the stomach, stuff it with a dressing made of the blood and rough flour and a little fat, tie it up and boil it. They wash the small intestines well, wind them about with a string of fat and roast them over the coals. The heart, lungs, liver, second stomach, windpipe, and stomach bag they cut up in small pieces and fry. The head and feet they singe, cook in hot ashes, then take off the hide and eat the inside. The ribs they roast over coals. The rest of the meat they may roast or pound with fat and fry in a pan or slice and hang over a wire to dry. They boil all the bones for soup.

They have ingenious ways of using plants in different stages of maturity. They boil young corn sprouts as greens, roast young stalks in the ashes, make a soup from the undeveloped ears when the corn first comes into silk, and from the first milk ears till the corn is dry they have

innumerable ways of baking breads, cakes and mushes. Squash blossoms they dry and boil with fat and meat for flavor. They eat melons immature as well as ripe, "as soon as they have flavor", and dry them in the sun to store for winter.

Churro Rustler

The Navajos got their sheep in the first place by stealing them from the Spaniards who wrote in their archives, "We are the shepherds of the Navajos." But they couldn't steal the knowledge of animal husbandry and have always thought of the sheep, like the wild animals they knew, as independent beings capable of taking care of themselves. Children were sent out with the flocks, not to supervise their grazing, but simply to see that they all returned to the hogan at night. Breeding followed its natural course and lambs were born from February to May.

These sheep, descendants by natural selection from the Spanish Churro, are light in weight, but quick and hardy. They will scramble over steep rocks where a Rambouillet wouldn't dare go. They can stand long walks and don't get too distressed if they have to go a day without water. They forage almost as well as a goat. The ewe is prolific and a very good mother. When lambs are born in winter the Navajo herder can pick up the little wet lamb and take it into the hogan to keep warm with no fear that the ewe might refuse to take it back. The fleece is light in weight, the outer coat mostly hair, but the undercoat is the best possible for hand carding and spinning. Rambouillet wool rates much "finer" on the market but Navajo women hate its grease and its tight crimp makes it impossible to spin satisfactorily by hand. Blankets woven from the old wool are of much better quality and appearance than those made from improved wools.

Since the 1880's Government officials and traders have been trying to "improve" the Navajo stock. The Navajos were always happy to receive the fine big rams that were offered them of the many breeds

WHEN SHE WAS A GIRL the range was lush and the Navajo had many sheep. Her family was about her. Now the hills are bare, the corn bins are empty and her sons and grandsons must leave home to find work with the white men.

NAKED IN THE SNOW, the men cool off after leaving their underground sweat bath through the blanket covered door. The Navajos traditionally clean themselves in this way to conserve precious water. The bath is heated with hot stones.

that were tried. The result has been a hodge-podge of all strains without dependable characteristics. Only in remote regions are the old type sheep still found. This breeding has increased the wool produced but has seriously affected the quality of the Navajos most important craft, weaving.

Recognizing, at last, the many valuable characteristics of the old type sheep the Indian Bureau and the Bureau of Animal Industry opened the Sheep Laboratory at Fort Wingate, New Mexico, in 1937 as a joint project to improve the Navajo sheep. In a series of experiments they are crossing the old breed with such long staple sheep as the Romney and Corriedale and, at the same time, trying to improve the Navajo sheep by selective breeding. They count on twenty years' work to establish a definite breed, but already considerable progress has been made.

When the railroads reached the southwest the Navajos were urged to increase their flocks for the eastern market. From 15,000 sheep and goats in 1870 they increased to a million in the early 1930's. This, of course, led to over-grazing.

In the old days a family felt free to move anywhere on the reservation. Now there is no unclaimed grazing land and they settle down to a limited radius, knowing that if they roam some other family may claim their grazing rights. So the range around the family hogans and water holes was cropped ever closer. The lamb and wool crop fell off, a fact which the Navajos failed to appreciate since they thought in number of sheep rather than weight per sheep.

The eroded state of the Navajo range was common knowledge when the dust bowl dramatized the importance of conservation. The technical brains of the Department of Agriculture focused all their energies on saving the soil; and a virtual army of technologists, agronomists and engineers moved in. The Navajo reservation was used as a vast field laboratory and, as much of the work was primary experimental research, many mistakes were made. Some positive things were accomplished. Hundreds of wells were dug and drilled for stock water, springs were developed and storage dams built, water spreading structures were designed to block arroyos in eroding valleys. The continuous drought of the past ten years has kept the Navajos from seeing any improvement in their range. They share the common belief that if it would only rain the problem would take care of itself.

The most drastic program of the conservationists was stock reduction. The goats, they said, cropped the range too short. The horses ate more than they were worth and the sheep would have to be reduced almost in half. To the Navajos this logic was incomprehensible and shocking. They resisted the program one hundred per cent. The Indian Service went ahead with its orders and reduced the herds by force, shooting sheep and goats and dumping the carcasses in trenches. The Indian Service had every intention of balancing the loss in economy. But politics being what they are, most of the planners went on to other jobs. All that remains is the sheep reduction.

That Which You Eat

Agriculture in Navajo land is a constant battle against wind, sand, and aridity. Today, just as a thousand years ago, his opportunity for farming has been very limited. Fifty thousand acres, about one-quarter of one per cent of the reservation lands, are now under cultivation.

Navajos believe the first man and woman were created from two ears of corn. In Navajo the word for corn means "That which you eat", so that it stands symbolically for all food products. Navajo corn is the same corn that the early inhabitants of the southwest, the cliff dwellers, cultivated near their canyon homes. Corn of myriad colors, red, blue, yellow, black, white, variegated, pink, dark red, blue spotted, grey, and black tipped. This corn, unlike other varieties, can be planted as deep as twelve inches because of its elongated mesocotyl. This extra depth, bringing it closer to the moisture, means

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SPINNING THE WOOL by hand and then weaving it into colorful rugs is the main craft of the Navajo. The women prefer the long staple wool, from the old type Navajo sheep, to the tightly crimped, improved wool. The women average only five cents an hour for this work but it can be done in the home between other jobs. Still a nickel will buy gum and the hucksters have customers even in the hogan.

THE WEATHER

Using the Weather Bureau, a barometer,

clouds and homely weather proverbs,

The farmer can do a first rate forecasting job.

BY ERIC SLOANE

WEATHER science has become so full of "occluded fronts," "diurnal varations" and other fancy names for good and bad weather that the average farmer may now feel out-of-date as a weather prophet. Yet the farmer still ranks along with the world's best weathermen. Although his meteorological language and approach has not been learned in school, once he becomes accustomed to using available weather information he will be amazed to find that much of his farm weatherlore has an actual scientific reason for being.

All around the farm are homely weather signs such as the consistency of hay, the restlessness of cattle, the action of smoke, the presence of dew. Call these things folk-lore if you wish, but don't belittle them. The scalp that the Indian chiefs kept hanging around for his medicine-man "to feel" for weather prediction, was supposed to be entirely superstition. Yet today's best hygrometer (an instrument to record humidity) is built around a few strands of human hair and their unusual ability to react to moisture!

Listen to an old farmer's writing. It

THE CHURNING TOP of a full-blown thunder-storm, left, is an awe inspiring sight. This photograph was taken three miles above the earth from the cockpit of an Air Force "Black Widow" just before the pilot flew his plane into it. He came out of it alive, thanks to his rugged ship, with electrically recorded data to increase our weather knowledge.

tells about the familiar weather phenomena that all farmers know.

"The hollow winds begin to blow;
The clouds look black, the glass is low.
The soot falls down, the spaniels sleep,
And spiders from their cobwebs peep.
Last night the sun went pale to bed,
The moon in halos hid her head;
The walls are damp, the ditches smell,
Closed is the pink-eye pimpernell.
Hark how the chairs and tables crack!
Old Betty's nerves are on the rack;
Loud quacks the ducks, the peacocks cry,
The distant hills are seeming nigh.
How restless are the snorting swine!
The busy fly disturbs the kine,
Low o'er the grass the swallow wings,
The cricket too, how sharp he sings!
Through the clear streams the fishes rise
and nimbly catch incautious flies.
My dog, so altered is his taste,
Quits mutton-bones on grass to feast.
T'will surely rain, I see with sorrow,
Our jaunt must be put off tomorrow."

One of our oldest recorded pieces of weather lore was uttered by Christ (Matthew, Chapter 16, verses 2 and 3) when the Pharisees and Sadducees asked him to show them a sign from heaven. He answered and said unto them, "When it is evening, ye say, It will be fair weather: for the sky is red. And in the morning, It will be foul weather today: for the sky is red and lowring." A red sunset is neither chance nor superstition. You are seeing the setting sun as it shines through the air that will reach you tomorrow. In most of this country weather tends to flow from west to east. If tomorrow's air is laying westward as a mass of wet stuff, the sun will appear yellow or gray. If tomorrow's air is dry, the sun will appear deep red. Hence "Yellow sky and setting sun, tomorrow's hay will not be done. But when the sun sets red in west, that's what haymen like the best."

HOW TO USE A BAROMETER

Using your barometer and wind directions, you can evolve a good home-made prediction system, particularly if you keep notes on the wind and pressure changes that accompany the weather in your vicinity. Here is a prediction system which will work in most parts of the U. S.

WIND DIRECTIONS	SEA LEVEL PRESSURE	WEATHER
E to N	29.80 or below, falling fast	Severe gale, heavy rain or snow.
E to N	29.80 or below, but rising	Cold wave.
S to E	29.80 or below, falling	Storm coming, winds, clearing and colder in 24 hours.
S to SW	30.00 or below, rising	Will clear very soon, several days of good weather.
SE to NE	30.00 or below, falling	Rain for 1 or 2 days followed by cold.
E to NE	30.10 or above, falling	In summer, rain in 24 hours, winter, rain or snow.
SE to NE	30.10 to 30.20 falling	Rain before 18 hours.
S to SE	30.10 to 30.20 falling	Increased wind, rain in 20 hours.
SW to NW	30.20 and above	Fair for two days unless pressure falls.
SW to NW	30.10 to 30.20 rising fast	Fair, followed by rain in two days.
Going to W	29.80 or below, rising	Clearing and colder.

The Weather Signs

Many of our weather proverbs are based on observations which we know to be sound. Here are some of the weather signs which are scientifically correct.

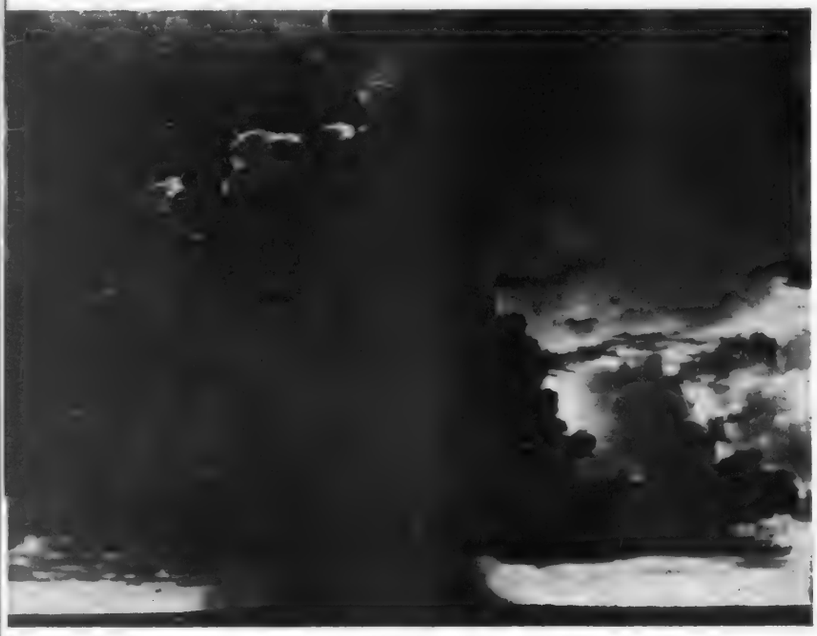
Dew. If the night air has clouds or other nuclei to take up moisture, that moisture will not form as dew. But if the air is clear during the night, moisture will form on the grass with the cooling of the air close to the earth. Hence, "When the grass is dry at morning light, look for rain before the night." And, "When the dew is on the grass, rain will never come to pass."

Odors. Odors become greater during the oncoming of a storm. The odors of cellars, trees, rotted ground, swamps, are somewhat held captive by the overpowering weight of dense good weather atmosphere. When the atmosphere thins out and pressure begins lowering, these captive odors begin to leak out and are carried by the moist air which accompanies storms and low pressure areas. Dogs can not follow scents as well during pressure because of this "loosening" of earthy odors.

Birds. Birds are often seen flying unusually high in the sky. When he sees them darting and playing about at such heights, the countryman says, "Good weather is

(Continued on page 31)

WHEN the feathery mare's tail cirrus clouds swish across the sky, rain or snow is likely within 36 hours. These web-like crystal clouds are very high, often at 30,000 feet.



THE TOWERING cumulonimbus, above, is a typical summer thunderstorm cloud. Its base is about 2000 feet and its top 20,000. It brings a short, violent rain which purges the hot air. These clouds often form independently of a bad weather front. Contrast it with the low roll of the advance guard of a cold front, below. Here is a windy squall line, 100 miles ahead of a cold front.

Weather from the Clouds

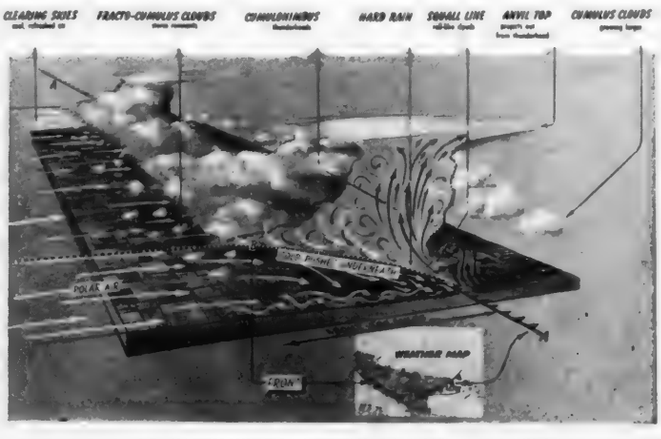
GENERALLY, clouds are not complete weather signs because by the time they are overhead, so is the weather. But there *are* times when clouds reveal, to those who know them well, what is just over the horizon and what to expect in another five or ten hours. But before we talk cloud language, take off your hat and sit in the weather classroom for a two-minute lesson on cloud names.

Imagine yourself looking at a gentleman diner puffing his cigar; he is puffing CUMULUS clouds. Now observe the typical layer of smoke that hovers over the whole room; that's a STRATUS cloud. Out in the kitchen the chef opens the refrigerator and out creeps a shapeless wisp of icy "smoke"; that is a CIRRUS cloud.

By adding "alto" to signify great height, and "nimbus" for head (rain head) such as altocumulus, cumulonimbus, etc., you have rather a complete cloud nomenclature. On dull, rainy days the stratus hovers at 2,000 feet or less; on bright days the fair-weather cumulus is at 4,000 feet. Altocumulus (sheepherd clouds composed of a solid pattern of white puffs) lay at about 15,000 feet, while mackerel or cirrocumulus are way up, over 20,000 feet. From 25,000 feet up, the air is so cold that only ice-particles can exist, so all the clouds, from webby cirrostratus to pure cirrus, are composed of tiny pieces of ice! Over 35,000 feet there is no weather and therefore, there are no clouds; that is the limit of circulatory atmospheric movement caused by the earth's heat. Above lays the strat•sphere, a cold (about—70° F.), silent space where the sky is black and the sun white. In our ladder of cloud-names we left out the cumulonimbus or thunderhead, because this daddy of clouds is an up-and-down sort of cloud starting at about 3,000 feet and towering to almost any height within the weather limits. Many climb to 20,000 feet. The full grown thunderhead has an "anvil-top," a flat stretch of cloud that reaches out ahead of the storm. At a great distance you can see this anvil-top and tell where the storm is heading, but when the storm is flowing toward you, the anvil-top flows overhead as the high "curtain" effect that precedes the thunderstorm. Because most weather patterns flow from west to east, if lightning appears from any direction but westerly, the chances are that the storm will miss you.

And now on to cloud lore. Rain, of course, does not fall from the very high clouds, so that lowering clouds will mean nearing rain. During summer you will find cumulus becoming larger, lower, darker toward afternoon; finally over the western horizon, if the air has been warm and unstable enough, you will see the cumulus form into the cumulonimbus or thunderhead. Such a storm will always be hard and of short duration. The cold-front thunderhead (see illustration below) and the summer

A COLD FRONT diagram, showing the cloud sequence. The insert shows how this would be indicated on a weather map.



thermal-type (rising hot air) thunderhead causes a heavy downpour but leave fine cool air in their wakes. They are like a broom, purging the atmosphere, so put your tools away and look forward to continuing in the morning—the weather will be good then.

But when the stratus clouds pull overhead, put the farmwork off, for the warm front storms may not be as sharp but they last longer. The warm air mass has a front that leans ahead, pouring over you long before it actually touches you. It is like oil flowing over water, for the lighter warm air rises and flows overhead as it moves on. First sign is a heaven completely covered with high white webs (cirrostratus clouds) often causing halos when the sun or moon shines through the ice crystals. Within four to ten hours the front will have moved on, the clouds lowered and the first drops of a long dull rain will have reached you. The cloud sequence is shown in the illustration below.

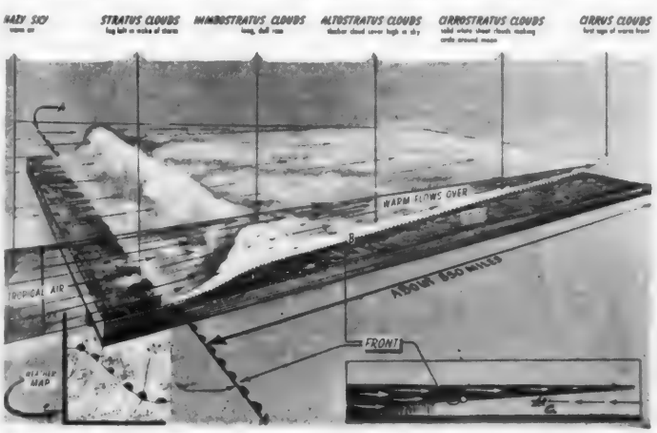
When a cold air mass moves in, the clouds take longer to form and the cumulus become very high and very small. When you see this, get on with your farm work; one to four days of fine weather is in store. But when the stratus sky-curtain is hovering and dull, look to your wind for an indication of weather change; if it is shifting to the west, good; but if it persists from elsewhere, the sun will not shine for another day or so.

Probably no one looks to the clouds more than the farmer and, therefore, no one is more appreciative of nature's most exciting gift, the sky panorama. Overhead flows the everchanging theater of the sky, more magnificent than any earth-contours, filled with clouds, giant gathering-places of moisture. Some of these will be fanned into dark masses, to descend as rain. Others will race eastward, as curtains for the rising sun.

As sentinels of the advancing weather, clouds dramatize the changes taking place in the upper atmosphere. Here are some cloud rules that hold true except in the mountains and near large bodies of water.

(1) Rain clouds that move up quickly will soon be past; a rain long in coming will last longer.
(2) Thin, high cirrus, disappearing as day advances—fair weather.
(3) Cirrus clouds thickening into heavier clouds in a very short time—stormy weather.
(4) Rapidly moving cirrus clouds from the southwest indicate a storm is near.
(5) "Mackerel scales and mare's tails make lofty ships carry low sails," in other words a storm is approaching.
(6) Cumulonimbus with towering thunderheads indicate the possibility of scattered thunder storms.
(7) Cumulus clouds that maintain their size through the day indicate fair weather.

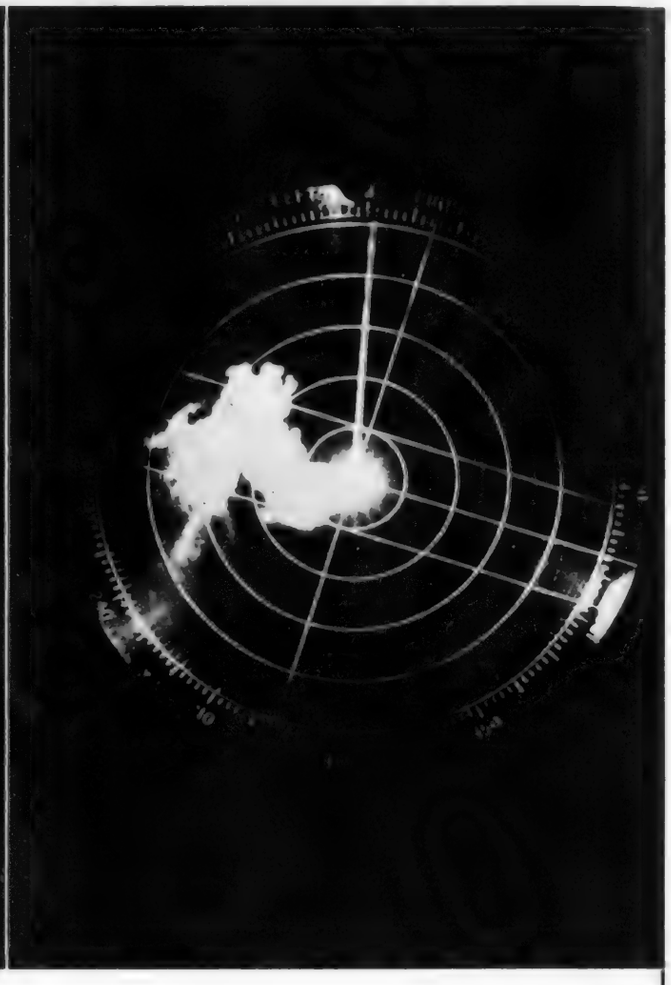
A WARM FRONT diagram. Note the distance over which the cloud system extends, and its gradual, over-riding approach.



FAIR WEATHER cumulus clouds are the farmer's friends, for all kinds of field work. Perversely, as with a gleam of watery humor, they may start to grow in height on hot days, and by late afternoon develop into local thunderstorms that urge haymakers to rush the last load to the dry shelter of barn floor.

A MACKERAL SKY resembles fish-scales. It has a wet look that is often made good by a slow-moving warm front, miles behind.

A



B

HOW RADAR "SEES" STORMS

RADAR was used during the war to "see," electrically, the planes and ships of friends and foe in daylight, darkness, or fog, far beyond the range of the human eye. With its radar a ship could navigate into a harbour in a pea-soup fog. Today, scientists are using radar to map and study storms in a two hundred mile circle around a weather station.

The extremely short pulses of electrical energy which are sent out by a radar station might be compared to a great many minute balls. As the radar operator throws millions of these electrical balls out into the sky, in any direction, he gets a "bounce back" from the hard reflecting wall of a rainstorm. The heavier the rainfall the more balls bounce back. With the marvelous sensitivity of his radar receiving set the operator can project on his screen the shape of the storm, and the direction of its movement. By further study and mathematical calculation he can determine how much rain is falling, and the speed at which the storm is traveling.

In the above radar screen photographs, the new and previously secret technique of the U. S. Air Force All Weather Flying Center at Wilmington, Ohio, is illustrated. In looking at picture "A" consider that you are standing in the center of the smallest circle, looking out around the horizon. As you turn around you see the sky map as a great circle. Instead of seeing only ten miles to the horizon you now see, with your radar eye, 100 miles. And you see through the haze, or darkness, or storm. The bright straight line projecting up from your radar set to the top of the screen is north. Each of the concentric rings are ten miles apart. So you are looking at a map, drawn electrically, which will show you everything that is happening in a sky area 200 miles in diameter. Like a huge knife, the radar beam can be tilted so that it cuts its slice near the ground or high in the air. You can study the storm near the earth or three miles in the air. In the radar scope picture "A" you can see that northwest, north and northeast of you there is a squall line of 16 thunderstorms. One of them, about 20 miles north of you is a big one. It is approximately 8 miles across and 15 miles long.

Suppose that, in a few minutes, you decide to study the storm that was 40 miles northwest of you in picture "A". By now it has moved in closer to you. You can change the range of your radar set to give an enlarged sky picture, as shown in "B". Here each ring represents two miles. This storm is about 8 miles long and 8 miles across at its widest point. The three white parallel lines are lined up on the course of the storm, from northwest to southeast. So you see that in a few minutes you are going to have the storm overhead. By using additional controls on your radar to study the relative brightness of the different areas of the storm and using mathematical formulas you would be able to tell how much rain was falling—if you were a trained weather man. Not only could you do this for nearby storms, but you could also reach out, way over the horizon, and study the distant storms for direction and intensity of rainfall. With a chain of such radar stations it will be possible to map the weather, in a matter of minutes, of wide areas with an accuracy that has not previously been possible.

THE WEATHER

(Continued from page 27)

here for a while." He is right, but what he could not see were the tiny insects that the birds were chasing. If the air were humid, the insects would be more earthbound because of their soggy wings, but in fine weather the tiny insects can reach greater heights. When low pressure air moves in, the thinned-out atmosphere requires more wingbeats for birds to keep aloft. Therefore, when you see gulls grouped on the ground or a great many birds roosting on trees, watch out for rain and high winds.

Bats and swallows. Bats and swallows have unusually sensitive ears because they use them as "radar" detectors to avoid hitting things and to locate insects in flight. When air pressure lowers, as it does before a storm, the change affects their sensitive ear membranes causing them to be uncomfortable. Hence, swallows and bats may be seen skimming close to the earth and especially above ponds just before a rain. Here the air pressure is higher for there is more air above them.

Halos. When you see a sun or moon halo, you are seeing through a sheet of ice, for cirrus (very high clouds) are made of ice particles. And a solid sheet of ice-clouds would only occur if a mass of rising warm air (a warm front) is on its way. Hence a halo (except during very cold weather) foretells a long dull, dripping rain with warmer weather behind it.

Smoke. When the fireplace backfires and smoke from brush fires is sluggish or returns to earth, rain is on its way. Smoke is a cloud of unburned carbon particles carried up by hot air over a fire. When these particles rise into a humid atmosphere they become water-laden and, "The smoke from chimneys right ascends, Then spreading back to earth it bends." Conversely, when smoke rises nearly vertically, we will have good weather.

From Springs and Steel

You will never hear any proverbs about the barometer, but its predictions are sound. Whether the barometer points to "storm," "change" or "fair" is not nearly as important as a check of its state of behavior. Whether it is steady, rising, or falling (combined with a wind observation) is a good basis for predicting tomorrow's weather.

The barometer which you buy is adjusted to sea level pressure at the factory; because you will use it to measure the air above *your* home, the altitude of your locality will have to be compensated for. The simplest way to do this is to call the Weather Bureau at 8 A.M. or 12 noon, and ask for "the barometric pressure adjusted for sea level." Use this reading and adjust your barometer to it, using the set-screw in the back. The table on page 27 gives the method of using a barometer for forecasting weather.

The Weather Bureau

The Weather Bureau was originally a part of the Department of Agriculture and many farmers have been discouraged to learn that it is now in the Department of Commerce. The Bureau is still the farmer's good friend. Its most popular information for the farmer is the "Weekly Weather and Crop Bulletin," which may be procured for fifty cents a year by writing to the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Next in popularity are the various radio farm forecasts and the telephone service for specific local weather information. The Weekly Weather and Crop Bulletin is useful for preparing, planting, and harvesting plans, while the radio or telephone services gives immediate predictions so that you may spray your trees in the morning without thought of it being washed off by an afternoon shower. Your local Weather Bureau Office or County Agent will give you time and stations broadcasting weather information. For new plantings or crop planning, the rainfall, frosts, and other data of past years are very important. The 1941 Yearbook of Agriculture, "Climate and Man," (for sale by the Superintendent of Documents, Washington 25, D. C., Price $1.75) will tell you the dates of killing frosts, the average growing seasons

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THE COLOR of the sky at dawn and the types of clouds, give the clue to what the day will bring forth in the way of weather. If it's a red sunrise the chances are you will be time ahead putting the wheat drill back in the shed; strip tobacco instead.

THE WHITEFACE

The Hereford leads all beef breeds in number of registered animals and dominates the ranges as well as the feedlots of the country

THE Hereford story begins in Herefordshire, England, in 1720. For it was "in the Seventh Year of the Reign of our Sovereigne Lord King George in the year of our Lord 1720" that Richard Tomkins made his mark upon the will which left to his nine year old son "one cow called Silver and her calf." From this cow, her owner, Benjamin Tomkins, and his heirs and fellow breeders in the county of Hereford, developed the main characteristics of the breed.

The breeding practices of that period have been described as "the haphazard union of any man's son with nobody's daughter." The emphasis was on size. Cattle were trained to the yoke to be used as draught animals through their mature life, and slaughtered in old age. The animals with the longest legs were given prizes. This trend probably reached its peak in the mammoth Lincolnshire Ox which stood 19 hands high and measured 12 feet from face to rump!

The industrial revolution filled the cities with folk who no longer produced their own food. The Hereford was born of this necessity to keep the beef eating Englishman happy and productive.

Benjamin Tomkins began to breed his cattle with the aim of achieving more than sheer size. It has been said of him that he was the first to breed for the butcher as well as for the plow. Along with the other early Hereford breeders, William Galliers, John Haywood, and the Tully family, Tomkins faced the problem of developing a breed that would thrive on the feeds that grew on the relatively poor lands of Herefordshire. The success of their work marked the breed with a trait for hardiness and thrift that is as distinct as the white faces and red bodies of the animals.

The Immigrant

The first Herefords to come to America were imported by the Kentucky statesman, Henry Clay, in 1817. Clay had seen the breed exhibited at the Smithfield Fat Stock Show in England when he visited there as a member of the peace commission to sign the Treaty of Ghent. His personal reparation from the mother country consisted of the purchase of a cow, a heifer and a young bull for his estate near Ashland. Although his herd was never established on a sound breeding basis, Clay expressed enthusiasm for the breed when he wrote, "My opinion is that the Herefords make better work cattle, are hardier, and will, upon being fattened, take themselves to market better than their rivals. They are also fair milkers."

Twenty-three years after Henry Clay's cattle had landed, Erastus Corning of Albany, New York bought 21 females and one bull imported by William H. Sotham and established the first substantial herd of Herefords in this country.

For all practical purposes the Sotham importation which Corning acquired in 1840 marks the beginning of Hereford history in the United States. Other breeders followed Sotham's lead in importing Herefords, but it was not until the 70's and 80's that a real start was made in breeding these cattle in the United States. It was during this period that some of the great foundation bulls were imported and large breeding herds established. "Sir Richard 2nd" was imported by John Merryman, of Maryland and later sold to T. L. Miller. C. M. Culbertson brought in "The Grove 3rd" and the great bull "Anxiety." Earl and Stuart established their herd in Indiana with the bulls "Garfield" and three sons of "Lord Wilton." Gudgell and Simpson began the most important breeding establishment in America at Independence, Missouri, with "Anxiety 4th" and "North Pole."

With the coming of the railroads in the decades following the Civil War, the tough, lanky Longhorns began a gradual disappearance with the more compact beef type of cattle taking their place on the western ranges. Range herds began to show the results of Hereford breeding and white-faced cattle arrived at the stockyards of the nation in increasing numbers.

The Hard Winters

Over-grazing and over-expansion on the western ranges coupled with severe winter weather had caused heavy losses during 1880-81, but the Hereford stood the winter better and suffered fewer losses than the other breeds. But the hardships of that winter were only a sample compared to the winter of 1886-87.

Scattered among the daily weather reports for February 1887 are such items as the report from the Dakota Territory which stated, "Great losses have been incurred by cattlemen, the stock perishing from the effects of cold and lack of food, the dead grass upon which they feed during the winter being covered to a

greater depth than usual with crusted snow." Once more the hardiness of the Herefords was tested. Writing of this winter, Vaughan, in "Breeds of Livestock in America" says, ". . . although the Herefords suffered considerable losses, it was again the consensus of opinion that they stood the test better than any other known type."

From 5,000 to 5,000,000

Between 1840 and 1886 the Hereford breeders of the United States imported 3,703 animals to form the nucleus of the breed in this country. An additional 1,109 were brought in from England before imports stopped in 1918. From this small foundation more than five and one-third million Herefords have been recorded in the American Hereford Herd Book. During 1947 35,000 Hereford breeders, living in every state in the Union, registered 356,530 animals. This gives Herefords an average of 1,154 calves a day, which is four and one-fourth times the total of the next ranking beef breed.

Herefords began moving up to their position of the leading beef breed during the early part of this century. The 1920 census show them a close second to the Shorthorn and the official U. S. census figures of 1930 put them in the lead.

PICTURED ON NEXT TWO PAGES is a herd of range Herefords coming from high summer pastures, following the grass to the lowlands. The herd will be wintered on the lower ranges. Feeder calves will be shipped to the feedlots of the corn states.

SAM MARTING is the Horatio Alger of Herefordom. Starting in 1932 with a rented farm and one Hereford cow, he now owns his own 800 acre farm and one of the important breeding herds in America.

Behind this phenominal growth were the breed enthusiasts who organized the American Hereford Association with headquarters in Kansas City, Missouri in 1882.

What Sort of Critter is He?

It has been many score years since men raised Herefords for the dual purpose of draught animals and beef cattle. Since that time the Hereford's job has been to produce beef economically and nothing else. Hereford bulls are noted for their prepotency in passing on to their calves their own ruggedness, grazing ability, and color markings as well as the breed's near immunity to tuberculosis. The Hereford cow has three jobs. She produces a calf each year, nurses him to a thick sappy weaner, and during the process she lays on extra fat to help her repeat the performance, or to be ready for the block as her owner chooses. The majority of the breeding cows can perform these functions with a minimum of feed.

The Hereford steers, having been denied a bull's more intense life, have but one aim, getting fat in the least possible time on whatever feed is available. American breeders have developed the modern Hereford type with great thickness of flesh, spread of back and bulging quarters designed to equip the animal with consumer preferred cuts of beef. The ideal Hereford type shows great depth of body, width of chest, and strong constitution to insure the farmer and ranchman maximum return from feed consumed.

The Hereford's body type is best described as a near-square rectangle with all edges and corners smoothly rounded. As Gilbert Cutter, a small breeder, said in describing a near-perfect animal "H C Larry Domino 12th". "Those round steaks hung out over his hocks like a truck bed juts out over the wheels." The entire frame is covered with an unusual amount of muscle and natural fleshing.

In size the Hereford is a little smaller than the Shorthorn and larger than the Aberdeen-Angus. The average weights of all Herefords exhibited at the American Royal Show during a five-year period showed: Aged bulls 2,238 pounds, two-year-old bulls 1,911, senior yearlings 1,439, junior yearlings 1,318, senior bull calves 979, junior bull calves 748. The same data shows: aged cows 1,689, two-year-olds 1,517, senior yearlings 1,269, junior yearlings 1,128, senior heifer calves 828, junior heifer calves 634. These figures are, of course, taken from animals fed for show condition and will run from 200 to 300 pounds more than would be recorded for range cattle of the same age. The winning Hereford herd in the Kansas Feeder Calf Contest of 1947 produced 500 pound feeder calves in 193 days. On the range, calves will wean at from six to eight months weighing 425 to 500 pounds.

THE GENTLE HEREFORD COW becomes the guardian mother when her calf arrives. She makes a fine range animal, protecting her calf against the elements and wild animals. Steers are usually dehorned, but cows are allowed to keep these weapons.

Color

The men who have advanced the Hereford breed in America have been practical cattlemen who have expressed little concern for the fads and fancies of their English brethren in the matter of color markings but have shown an enormous interest in conformation and ruggedness. As an example of this difference American Herefords have smutty or clean noses as nature prefers, whereas English breeders frown on the dark splotches which make a nose smutty.

The distinctive red body and white face of the Hereford has, in part, been responsible for the general public's association of the terms "beef cattle" and "Herefords." The shade of red varies from dark to light with ranchmen and feeders, who have a preference leaning toward the lighter shades. The white includes the head, breast, crest, underline, feet and tail switch. Red eyelids occur and, like smutty noses, are taken at face value, some breeders even preferring them because of less likelihood of pink eye susceptibility. The hide is medium to heavy in thickness, but usually mellow. The hair is long, thick and silky with a tendency toward curliness. The liberal hide and heavy hair coat are factors which give the breed added fitness for range existence, but detract slightly from dressed yield on the packer's rail.

They Handle Well

The Herefords have a placid disposition and are easily gentled. The Hereford cow is usually gentle and easy-going, but at calving time exhibits a streak of aggressiveness, self-reliance and cunning that make cowmen agree that she needs only a good letting alone. The bull can be approached in the pasture and have his head scratched and his rump slapped without increasing the handler's insurance risk. In purebred herds most bulls and cows are halter broken and handle with ease. The youngsters in FFA and 4-H organizations find that this breed feeds well and handles easily under a variety of conditions.

With or Without Horns

The majority of Herefords have horns. Those of the hornless branch of the breed

TWO THREE-YEAR-OLDS compare notes in the pasture. This would be unsafe with many dairy bulls but Proud Mixer is glad to see his pint-sized friend. Rugged and masculine, the Hereford can sire 100 calves a season when hand bred.

are called "polled Herefords" and have been developed from polled sports, that is, hornless freaks, from horned ancestors. The majority of steer calves in commercial herds are dehorned by the producer when the calves are castrated, vaccinated and branded. Dehorning, like all agricultural jobs, has been continuously improved, and today the bell-iron method used on calves up to three months of age requires only a 10 to 20 second application of a hot iron. It produces no blood and is no more severe than hide branding. Other good and simple methods are also used. The majority of mother cows in the big commercial herds wear their horns, cowmen feeling that with this equipment they are bolder, will scatter more in grazing and are better able to protect their calves. The ideal Hereford horn curves downward and slightly forward and the horns of show animals can be trained to this pattern if they are not naturally satisfactory.

One A Year

Gentle Annie, a noted Hereford dam, is an outstanding example of the breed's ability to produce with regularity until well advanced in years. In 19 years she has produced 17 calves which have been recorded, and from her daughters and their female offspring 137 head have been issued registration certificates.

Crossbreeding the Hereford

Cross breeding experiments involving the use of the English breeds have been tried from time to time by various experiment stations, but to date is recommended by none. Neither is the practice recommended by the United States Department of Agriculture, which, too, has tried it at the Miles City, Montana Station. Obviously, any crossbreeding involving numbers must be based on Hereford females since they comprise the bulk of the commercial cattle population. Thus crossbreeding can be accomplished in mass only by displacing the Hereford bull which, Hereford breeders believe, has amply proven his ability to hold his own.

What's Wrong With Him?

Most Hereford owners will tell any stranger that there are but two types of animal in the breed, very good Herefords and still better Herefords. Like any other breed, however, the Herefords have some faults. The Herefords lack the size of Shorthorns and the refinement of Angus, yet they combine quality and size to a degree not achieved by either.

The Hereford's husky start in life has been criticized as a cause of calving trouble. Hereford calves weigh from 65 to 90 pounds at birth, and since size at birth is dependent largely on the size of the sire used, it is logical that they are heavier on the average than the Angus and more like the beef Shorthorn in initial weight. Despite the size of the calves large range herds come up annually with calf crop percentages which are outstanding.

The distinctive color markings of the breed seems to be responsible for two other troubles that are more common to Herefords than to other beef breeds. The first is pink eye, an occasional nuisance disease, to which those animals which do not have red eye lids are susceptible. The second trouble, is chapped teats and sunburned or snowburned udders, not entirely confined to Herefords.

Some Herefords give too much milk and, to the cowboy's disgust, have to be milked out for a time following calving or spoiled udders result. Others give too little milk. Both conditions are undesirable. The vast majority of Hereford cows raise their calves and nurture them well.

A high percentage of Herefords have small ties. A tie is a spot or region along

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CHOLERA respects neither size, age, nor breed. There is no cure, but there are five ways of creating immunity, all effective and all practical within the limitations of the method.

CHOLERA

BY ROBERT ZINN

GUST MENSENDIKE took one look at his hogs and started for the house on a dead run. He burst into the kitchen, and just as he expected, his wife was on the party line.

"Get off that phone Belle; I gotta get Doc Carter right now. Those hogs' tails are hanging as limp as binder twine. It looks like cholera in the hog lot."

Of all the ills that nature visits on the farmer, there is nothing that fills his heart with panic more than the sight of his finest hogs buckling in the hindquarters, the dread symptom of that scourge of the hog world, cholera.

Cholera was first reported in this country in 1833 in Ohio. For 57 years the virus preyed unchecked on American swine, an ever-present ghost that roosted on the shoulder of the man who raised hogs. In 1887 and 1896 it assumed the proportions of a plague. In 1907 the first effective preventive serum was discovered, but even then the disease increased, reaching a peak in 1914, when twenty million dollars worth of pork was destroyed. Since then incidence has bobbed up and down like the fever chart of a malaria patient. Today 30 hogs out of every thousand die from cholera every year, a loss of more than twelve million dollars.

Why is this true when hog raisers have had available, for over 40 years, the effective means of cholera prevention?

That's not an easy question to answer, but let's give it a try. The answer is in four parts. Part one concerns the ultra-conservative turn of mind of all of us farmers. We ordinarily cast a cold, fish-like eye on new-fangled ideas, especially if the idea presents no immediate money return. Therefore, it was years before the practice of immunizing hogs against cholera was very generally followed. Even today there are many farmers who do not believe in vaccinating their pigs and will have nothing to do with such a program. "There's never been any cholera on this farm," they say. "I'll take a chance and save the cost of treatment."

A second part of the answer is *procrastination*. There is no place in the world where it is easier to put things off than on the farm. Some jobs are sure to get pushed back to that "tomorrow list" and unfortunately the task of vaccinating the pigs often lands there. Then that "tomorrow" never comes or maybe arrives too late.

Part three of the answer is the scarcity of competent veterinarians. Many farmers would get their hogs immunized if a good vet were handy to do the job.

The fourth and last reason is the controversy over which method to use, for there is more than one method. In fact there are five possible ways to get the job done, each having advantages as well as disadvantages. Let's take a look at these

various systems and see just what they have to offer. If we look at these methods in the order in which they came into use, the "Double Treatment" should receive first attention.

The Double Treatment

Preliminary experiments to find a check against the cholera scourge were started in 1903. Success was finally achieved on the Iowa State College campus in 1907 with the development of a preventive serum. From this work developed the present day procedure for immunizing hogs against cholera by use of what is commonly called the Double Treatment.

The Double Treatment is also designated by two other names, the Simultaneous Method and the Serum-Virus Method. Which names you use matters little for each clearly identifies the method. When hogs are immunized by the Double Treatment they are given two injections or shots, one injection being potent hog cholera virus and the other anti-hog cholera serum.

When this method of immunization is used, it must be kept in mind that the pigs are being injected with live hog cholera germs (the virus) which are counteracted by the serum. In other words, the virus actually gives the pigs a mild case of cholera, and the serum cures it.

The Double Treatment has been thoroughly demonstrated as being capable of producing a solid and lasting immunity, an immunity that lasts as long as the hog lives, *provided* only potent serum and virus are *properly* used on healthy pigs. Pigs should be completely free from disease or parasitic infectation which might tend to lower their vitality. For two or three weeks after vaccination the bodily defenses of even healthy pigs are lowered, so it can be seen that the vaccination of unthrifty pigs with serum-virus is asking for trouble. So-called "breaks" are likely to occur among animals that are not in top physical condition when vaccinated by the Double Treatment.

The term "break" is used when referring to illness which might follow the use of the Serum-Virus method of immunization. These breaks are usually spoken of as "serum breaks" or "virus breaks". The terminology is unfortunate since the illness is not necessarily due to inferior serum or inferior virus. Carelessness is probably responsible for more breaks than anything else. It is quite natural for serum breaks to occur when the pigs are not given enough of the serum to counteract the virulency of the virus. This same term is used to describe the troubles that sometimes follow when pigs already carrying some other disease are innoculated. This type of break usually occurs about ten days after the pigs have been vaccinated.

The virus breaks can be caused by either of two conditions. The danger is greatest when the pig is given too small a dose of the virus. Naturally, if smaller than the prescribed dosages are given, trouble can be expected. A second cause for breaks is the use of impotent virus. Virus that does not carry the proper potency will not do the job. However, the impotency of the virus is not necessarily the fault of the manufacturer. Many times, biologicals, a fancy word for medicines, of highest quality lose their potency because of improper handling after leaving the laboratory.

For these reasons it is very important that the vaccinating be done by a competent veterinarian. The vet is the man with the training and experience to do this kind of work. He should be qualified not only from the standpoint of knowing how to do the job, but also in knowing the best biologicals to use. Another very important factor is his ability to look at the pigs and determine whether or not they are in condition to be immunized.

The objection most often heard about the Double Treatment is that the pigs treated must have their feed greatly reduced and held to the reduced level for a period of two or three weeks which, of

THE JOB OF VACCINATING a hog is in direct proportion to his size. Pigs this size can be lifted by the hind legs, the head clamped between the knees, and the vaccine injected before he has time to say "Oink!" It's a hot job at any season.

CHOLERA IS WELL ALONG in a hog when he goes down in the hindquarters, but it is often the first visible symptom. The healthy hog has more resistance, but is not immune.

A LIVER from a cholera hog. The spots are lesions caused by hemorrhages. Packing house inspectors spot cholera hogs by the lesions in the liver and other organs.

course, slows up gains. This objection, however, can be eliminated if the pigs are vaccinated at about six weeks of age. It is only the older animals that need go through the reduced feed routine.

A second objection, and one far more serious, is that in the Double Treatment, the farm and hog lot are continually being seeded with live cholera virus. If you use this method on any pigs, you've got to use it on all you own. Many farmers make it quite plain that they do not like this idea and many others refuse to practice cholera immunization for just this reason. This is true, but the method cannot be used without doing this. In spite of these criticisms the Double Treatment method is used successfully on millions of hogs every year. You can't have your cake and eat it too, so the thing to do is to take the necessary precautions.

The Single Treatment

One alternative for the man who does not want live cholera virus brought on his farm is to have his hogs vaccinated with serum only, commonly called the Single Treatment. This is the second of the five methods for cholera prevention. The Single Treatment, unlike the Double Treatment, immunizes the hog only temporarily, for a period of only 21 to 30 days. In spite of this very great disadvantage there are instances when its use is wholly justified. They are: (1) For a herd that is threatened with cholera and already sick with some other disease. (2) For a herd that is suspected of having cholera and it is not advisable to wait for vaccination until a laboratory report is received. (3) For hogs that are to be exhibited in the show ring in too short a time to use the Double Treatment. (4) For the protection of feeder pigs that are to be sold in about a month. (5) For non-immune pigs that are to be shipped cross-country.

Even though the Double Treatment is being used extensively and at savings of millions of dollars to the swine industry, there has been little or no progress in wiping out the disease. This failure cannot be blamed on the Double Treatment, but nevertheless it is a problem of great concern to hog raisers. In an effort to find a treatment more acceptable and less likely to be opposed by farmers, livestock scientists have been searching for years for a method of permanent immunization which could be administered without the use of live cholera virus.

The Crystal Violet Treatment

After many unsuccessful tries three men, Dorset, McBryde and Cole, of the U. S. Department of Agriculture, Bureau of Animal Industry, finally came up with the type innoculant which appeared to be the answer. The biological developed by these men is known as Crystal Violet Vaccine, and is prepared from the blood of pigs which are in the acute stages of cholera. The name Crystal Violet is used because to infected blood is added a purple aniline dye known as Crystal Violet. Remarkably enough, this dye destroys the disease producing properties of the blood, but does not destroy its immunizing properties. Pigs vaccinated with Crystal Violet develop immunity to hog cholera in about three weeks.

As often happens in the world of scientific research, two products were developed independently and at about the same time. In addition to Crystal Violet Vaccine, another known as Boynton's Tissue Vaccine, or more commonly B. T. V., was discovered and is the fourth means of cholera immunization.

In the Philippines in 1917 Dr. William H. Boynton started his research on the development of a vaccine that would produce immunity to cholera and yet be incapable of causing the disease. The work in the Philippines continued until 1924 and since then Dr. Boynton has been working at the University of California.

Dr. Boynton's product, B.T.V., is made

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THE FIRST SYMPTOM of cholera is a rise in temperature. The busy farmer has no time to take the daily temperatures of his hogs, but he can give them periodic checks. Indicated above is the best way to hold a pig when checking his general condition. His tail will stand the strain.

THE PIOUS VERSE and the variety of stitches used by Margaret Wells in producing her colorful sampler are typical of the work done by the women of America from the time of the Pilgrims. The production of an acceptable sampler was a part of the sewing training of every girl during this period. The samplers themselves were used as decorations and as reference works for selecting stitches to be used in sewing. Margaret's sampler now hangs in the Smithsonian Institution.

SAMPLERS

HUMORISTS insist that when that fabulous ship, the Mayflower, landed on the American shores it must have carried a record-breaking cargo of unidentified stowaways to account for the millions who now claim direct descent from its passengers. Nothing, of course, is said of the baggage of these fictitious ancestors, but it seems certain that the 24 women on the official passenger list carried with them their sewing samplers and may even have passed the time on that dreary voyage improving their stitches.

The sampler of the Colonial period, a narrow linen strip usually about seven inches wide and two or three feet long, was used by the owner to record her techniques in the cross-stitch, the drawn-work, faggot stitch, petit-point, darn, and the other fancy stitches which she might later want to study before attempting their use in the decoration of linens and wearing apparel. The sampler, literally "a sample of stitches", was no new thing even at that time, its origin dating back to the time of Chaucer when they were known as ensemplers. One of the earliest historical mention of a sampler appears in the account book of Elizabeth of York which shows that on July 10, 1502, the following transaction was made, "for an elne of lynnyn cloth for a sampler for the Queen viii d. To Thomas Fische." Other early documents record royal inventories listing samplers as prized possessions.

The earliest existing sampler produced in America was made by Loara Standish, the daughter of the bold but bashful Captain Myles Standish, military leader of the new colony at Plymouth. On her long linen strip Loara sewed wide bands of geometrical and floral designs with home-dyed thread using eyelet, satin, buttonhole, chain, outline, and cross-stitches. At the bottom of her sampler she inscribed, with yellow and blue thread, "Loara Standish is my name" and below this, being a pious Pilgrim girl, she further stitched:

"Lord Guide my heart that I may do Thy will
"And fill my heart with such convenient skill
"As will conduce to Virtue void of Shame
"And I will give the Glory to Thy Name."

This first American sampler is typical of the period, being the product of a mature needle woman, and its inscriptions were to be models for many more to follow.

Samplers grew out of the need each woman felt for a reference work for the multitude of fancy stitches which she might wish to use in her sewing. There were few, if any, books available to these women though there is an obscure reference to a sewing book printed by Peter Quentel in 1527 and later there appeared "The Needles Excellency. A New Booke wherein are Divers admirable workes wrought with the needle newly invented and cut in Copper for the pleasure and profit of the industrious. Printed for James Boler and are to be sold at the Syne of the Marigold in Paules Churchyard. 1632." The women created their own compendia of stitches by using them in decorative bands sewn onto the narrow-loomed cloth of their day. Later when they wished to embroider their linens or some bit of finery they could find the desired stitch on the sampler and recall how it was made.

With the beginning of the eighteenth century came changes in the production of samplers. The improved looms of the time turned out a much wider cloth and the samplers changed from long narrow strips to wider, more nearly square, pieces. The change in shape brought with it a change in design element. Borders took the place of the bands and greater unity was achieved in the decorative effect. Another change of this period was the change in age of the makers of the pieces. Before this time mature women had produced the sampler, but now they became the work of young girls, the show piece which the girl produced to demonstrate her proficiency with the needle.

The young girls in school learned their needle work along with their alphabet.

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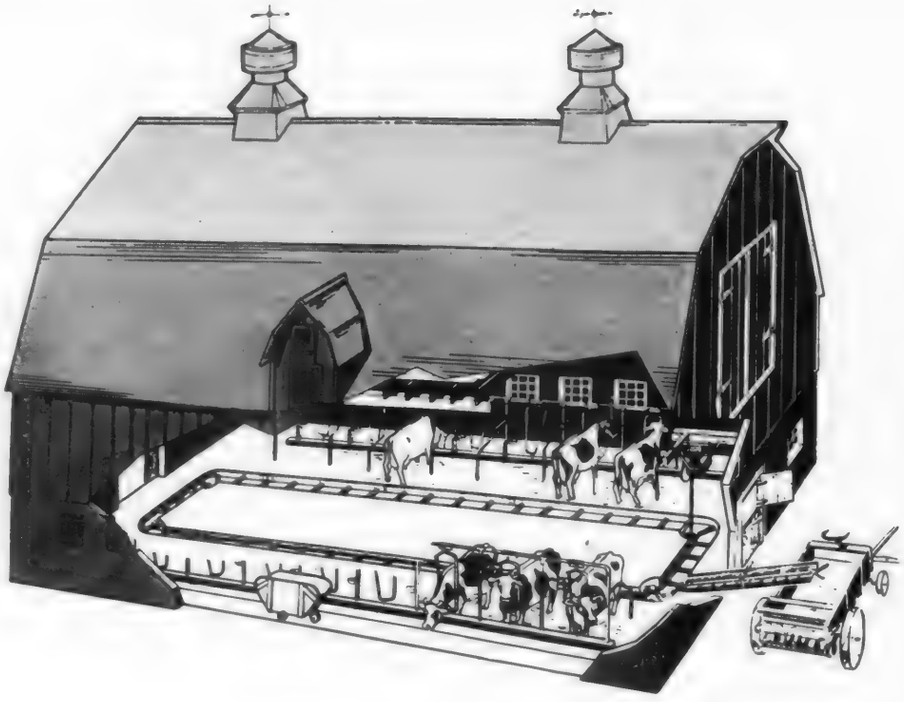


ELECTRIC BARN CLEANER

A traveling chain carrying paddles the width of the gutter cleans the dairy barn in a few minutes.

"WE'VE got our new barn cleaner working now," says Walter Bee, "and sometimes I just like to stand and lean on my manure fork and watch the thing work. When a fella spends 365 mornings and 365 evenings in a dairy barn I think he's got a right to favor himself with anything that takes the backache out of dairying."

Kicking some caked manure off his shoe into the gutter, Bee continued, "This endless chain with its wooden paddles cleans the whole barn in about six minutes, and drops the manure in the spreader out in the shed. It used to take two of us over half an hour to do the same job, only then we didn't lean on our manure forks."

Bee had the misfortune to have his barn burn down one night last October. Luckily, his herd was out in pasture. A farmer of his age with less stamina might have said, "We'll sell the herd and farm and move to town."

Not Walter Bee! He bounced up from the ill wind and saw his chance to build a modern barn, starting on a new concrete floor with built-in barn cleaner. Within a couple of days after the fire, Bee's neighbors around Bethel, Ohio, had found room in their pastures and barns for his cows, and he was rounding up masons and carpenters to get started on a new barn. He took his truck to Wisconsin to save time in getting a load of laminated rafters for the barn roof, and in a month and a half there was a roof on the new barn.

"I guess I'm the first dairyman in the county to have a barn cleaner," says Bee, "and it is one thing in the new barn that I wouldn't want to do without. I like to start it going the first thing in the morning when I come in the barn. I dust a little superphosphate over the gutters as the cleaner is running to give the manure an extra shot of phosphate. Then when the gutters are about swept clean I put a little lime in them to finish off. They are cleaner when I push the "off" switch than they were after we cleaned them by hand.

"I knew the cleaner would save us time," says Bee, "but the thing that surprised me most is how little it costs to run. We've checked our power use for the last month and it's costing only four to six cents a day." Swinging a big hand along the cud-chewing line of Jerseys, Bee continued, "I've found the secret of making one of these electric hired hands do a good job. You've got to use plenty of bedding—even more than if you are cleaning by hand. Then when you pull the bedding out of each cow's stall you get all of the manure. Lots of straw in the gutters makes the cleaner work better, too. It gives the sweeping action of a heavy barn broom."

What A Barn Cleaner Costs

With an initial investment of $500 to $1100, which includes the installation, a barn cleaner looks like a good investment for any dairy farm that has ten stalls or more. In addition to the actual time saved in the cleaning operation the discharge of the cleaner directly into an outside shed or manure spreader saves the time which was needed to push a cart or wheelbarrow out to the shed.

The manure could even be spread on nearby fields with the time saved in the cleaning operation. This kind of manure handling will put back approximately 70% of the nitrogen, 75% of the phosphorus and 80% of the potash taken out of the soil by the grain and hay that the cattle have been fed. With the fertilizer value of such high quality manure being about $16.00 a ton, and with nothing figured for its organic matter, it's easy to see how the owners of barn cleaners class them as fertility builders as well as time and labor savers.

Two types of cleaners are being made at the present time. Each has variations to fit the particular layout of the barn. With either type an outside elevator can be used to raise the litter to any height. The cheaper type, which is suitable for a barn having one row of cows, is made of two link chains. Metal or wood cross bars that are slightly narrower than the gutter connect the two chains. The chain fits in the bottom of the gutter and extends through the end of the barn to the discharge point, or it can be taken up an incline plane at the end of the barn so that the discharge is high enough to drop directly into a manure spreader. This type of an installa-

(Continued on page 96)

THIS IS Walter Bee of Bethel, Ohio. After his barn burned down last fall, he decided that rebuilding it was his big chance to have the kind of modern barn, equipped with labor-saving devices, that he had always dreamed about. Starting with a new concrete floor, built around a barn cleaner, Bee has made his new dairy barn a model of efficiency. Says Bee, "Our barn cleaner takes all of the manure out of the gutters and has it loaded into the spreader in six minutes.

Men are making a living raising pheasants for the open market. They thrive in captivity but are more demanding than poultry.

Pheasants

BY CHARLES P. FOX

A COCK pheasant, exploding out of the stubble of a wheat field, his iridescent plumage flashing against a backdrop of autumn foliage, is a sight that stirs the blood of every hunter. Each year his multicolored cloak is seen in more fields, bringing more pleasure to the sportsman and more meat to the dinner tables of the country. This shy, untamable native of the Orient with its slightly reptilian head, has captured the fancy of American sportsmen and bird fanciers.

The pheasant is a comparative newcomer to America, but such is his hardihood and vigor, and his ability to adapt himself to a variety of environments, that he has multiplied prodigiously, both in captivity and in the wild. Conservation departments in the states where he thrives best release thousands each year to stock new areas and replace those taken by hunters; commercial breeders turn out other thousands which go on the market as food or breeding stock. The pheasant is fast displacing the vanishing quail and partridge as America's premier game bird, and his meat is adding a tasty touch to American menus. The breeding of exotic varieties now engages the attention of a growing number of fanciers.

The pheasant is a distant relative of the chicken and in captivity is brought up about the same. Take the ordinary barnyard fowl and add a touch of shyness, an ability to fly, and a wary distrust of humans, and you have a pheasant. He may not be quite as intelligent as a chicken, which is saying little for his IQ, but he is probably not as dizzy as a turkey.

Pheasants are being raised like chickens, in backyard lots and on large commercial farms. They are going to the dinner tables of restaurants, hotels and homes. Pheasant raising is no longer an experiment or a hobby; it's here to stay.

The pheasant is a native of the Orient. A thousand years before the Christian era the Chinese were using them for food and sport. It is in China and other parts of eastern Asia that the rarer species, now raised in America only in small numbers, are found in the wild state. The commonest of all pheasants in America is a cross between various species of the Ringneck.

The first importation of pheasants in America was made by George Washington, who brought over several pairs from England for his Mt. Vernon estate in 1789. They were crosses, the descendants of several varieties of Ringnecks brought in by the Romans. A year later Ben Franklin's son-in-law, Dick Bache, failed with an importation on his New Jersey farm.

The so-called "Ringneck" or "Chink" found in the United States today may be any one of several species: Eastern Chinese, Kobdo, Manchurian, Formosan or Kirghiz Mongolian. These species vary but slightly in size and coloring and all of them have rings or bands around their necks. They seem to fare best in the northern half of the country, principally in the heavy grain producing states, but some are found in all states.

Anybody can raise pheasants provided he has the necessary space and the patience to learn their habits. People who

THE RINGNECK is the favorite of the commercial breeders but the fanciers like the more exotic types such as the Impeyan, on the opposite page, and the Lady Amherst, both owned by Fred Walters, Port Allegheny, Pa. The Impeyan is valued at $200.

are familiar with chickens find pheasants more exacting. You can raise pheasants for fun or for profit, but breeders advise that whichever you choose, you start in a modest way and grow as your experience grows.

Larry Brooks, who has a small farm on the outskirts of Indianapolis, discovered one morning that one of his bantam hens was broody. Remembering the suggestion of a friend, he purchased a dozen pheasant eggs from a breeder in the vicinity and put them under the bantam. The bantam broke one of the eggs and one was sterile, but a little over three weeks later Brooks had ten fuzzy pheasant chicks.

From his grocer he got a cardboard carton about two feet square, placed a little straw in the bottom, and introduced the bantam mother and the chicks to their new home. When the chicks were 24 hours old they were given a meal of clabber milk and were fed this four times daily thereafter with chick mash added after the second day. Once daily they were fed hard boiled egg and some greens, either lettuce or lawn clippings. The straw was changed daily.

He fed them only what they could clean up in a few minutes, any surplus being removed because sour mash causes trouble. The little fellows were happy in this environment until they were six weeks old. They were then placed in a brood coop on clean, sterilized ground. A V-shaped pen was made around the coop and a small hole cut in the side to permit traffic by the chicks but not by mother. After a few days the pen was removed and the chicks allowed the run of the field. The bantam always clucked them in at night. When they got too large to roost in the coop a wire pen was built to confine them at night.

The pen and brood coop was moved frequently because pheasants are particularly susceptible to contaminated range. After they began to find some of their food on the range, the mash ration was reduced and changed to a growing mash and later to a scratch feed. Range shelter was a shock of corn set up around a tree.

When the pheasants grew up and began to lay, Brooks penned the hens and two cocks in an enclosure, gathered the eggs, and set them in a small incubator the second year of his venture.

Brooks has long since graduated from pheasants as a side line. He now has a regular list of customers and sells all he can raise on his small acreage.

Irving Perkins, Big Pheasant Man

Eggs, chicks and adult birds are shipped by the thousands each year from Oconomowoc Game Fields, Oconomowoc, Wisconsin, which is owned and operated by Irving J. Perkins. His operating force consists of his wife, Leola, and his daughter and son-in-law, Evelyn and Ernie Livieri.

Oconomowoc Game Fields was started in 1933 as a hobby, but the operation soon developed into a full time job. Perkins,

like Brooks, learned to walk before he entered the big race. Today, upwards of 10,000 birds are raised each year. Some are sold to restock hunting areas, others for field trials; some go to hotels and restaurants, some are sold for holiday gifts and some to other breeders.

Over a period of years of selective, genetic breeding, Perkins has developed a heavier and generally superior strain of pheasant. As the birds develop through the summer months and are handled during pen transfers, he segregates outstanding specimens. Birds that are perfectly marked, unusually vigorous or heavier than average are placed in separate yards marked "Not for Sale!" Careful breeding has increased the average weight one half to one pound more than wild birds.

During the winter months the breeding birds are kept in open ranges with only standing corn and sunflowers or brush piles for shelter. Their winter menu consists of "scratch-feed," corn, wheat, oats, barley, and buckwheat. Not until February, just prior to egg laying season, are they put on special, high vitamin content pellets. While Perkins has feeds prepared locally, most of the large milling companies have specially prepared pheasant feeds. The laying pellets usually contain twenty to twenty-two ingredients, including minerals and vitamins.

In the wild state pheasants are omnivorous. The diet of chicks runs heavily to bugs, insects and worms. When there is a good choice of feed, the wild bird will balance his diet successfully from weed seeds, grain, and insects in season. Grit, preferably native gravel, is necessary to good health.

Each egg laying season, April, May and June, the hens average 50 to 70 eggs each. The cocks run with the hens during the egg laying season, 1 cock to 6 hens, up to 500 birds in each enclosure. The eggs are laid in the grass, in brush piles or corn shocks, wherever the hen happens to be when she feels an egg coming on. Occasionally, 6 or 8 hens will lay their eggs in one spot, but generally the eggs are found singly and at random all over the pen. The eggs must be gathered at least 4 or 5 times a day to prevent the heat of the sun from starting the hatching process and to avoid the possibility of the eggs being broken and eaten. Normally pheasants will not eat their own eggs, but occasionally birds will taste an egg accidently broken and, liking the flavor, will start an egg breaking spree.

All of the eggs are carefully cleaned and placed in tilt racks where they are stored until there are enough to fill an incubator. The eggs must be kept in a cool place to keep the hatching process from starting and the racks are tilted each day to keep the embryo or germ from adhering to the side of the shell. All species of fowl turn their eggs once a day with the beak.

Four 3000-egg incubators are used at Oconomowoc. During the incubation period, which lasts from 22 to 24 days, the temperature is held at 99½° F. While in the incubator the eggs are tilted every 4 hours.

Just before the chicks start to "pip" (break the shell) they are moved into the hatchers, where another two days are consumed before they are all hatched. The hatcher temperature is held at 103° F.

Occasionally a chick doesn't have quite enough strength to break the shell and must have some assistance. During this critical two days close watch is kept to see that all the chicks are hatched. The heat is sufficient to dry out the tissues and kill the chicks in the shell if they are too slow or too weak to break through.

After the newly hatched chicks are thoroughly dry, which takes two or three hours, they are moved into battery brooders where they remain from seven to ten days. Not until they reach the battery brooders are they fed and watered. Day-old chicks to be shipped are placed in regular chick pullmans and are not fed or watered until their destination is reached.

The starting mash and pellets given to chicks in battery brooders are carefully prepared feeds designed to get the birds started fast. Feed and water (at room temperature) should be kept before them at all times.

Pheasants develop very rapidly. Nature's method of protecting them from their natural enemies is to speed up wing development. At 7 to 10 days the chicks are able to fly for short distances and when they are moved from the battery brooders to open ranges, their wings are clipped for the first time. Only one wing is clipped; this upsets their balance sufficiently to prevent them from flying over the sides of the runway.

As soon as the chicks reach the open ranges steps must be taken to protect them from natural enemies. As a means of protection from hawks, owls and other air-borne predators, the runways are planted with sunflowers, rape, wheat, oats, barley, buckwheat and clover. This dense growth serves to hide the chicks from the air and provides green food as well.

To protect his birds from predatory mammals Perkins uses a highline electric fence controller—the same type used for his dairy herd. His poultry fence consists

SIX WING-CLIPPING operations are performed on each chick before it grows up. Mrs. Leola Perkins and her daughter clip the wings of 10,000 chicks raised each year on the Oconomowoc farm. First clipping is at ten days old. One wing only is clipped.

→

A PHEASANT TOLERATES confinement; he never accepts it and even if raised in captivity, is at home in the wild the moment he is released. Breeders sell many birds to gun clubs and for stocking preserves.

of one inch mesh wire buried a few inches, and 18 inches above ground. From that point to the top of the fence the mesh is two inch. Since the one inch mesh is animal proof, a single strand of smooth, galvanized wire is stretched around the outside of the fence, just where the one and two inch meshes meet. By the time the animal reaches the charged wire all four feet are in perfect contact with the mesh fence, which is well grounded. The effectiveness of the installation is well demonstrated by the reduction of losses to predators. Before using the electric fence Perkins lost 300 to 900 birds each year; now the losses are negligible.

The ranges for the young birds are 30 feet wide and 150 feet long and each is equipped with a 10 by 12 foot brooder house containing an electric hover or brooder to protect the chicks from cold and rain. About 200 chicks are placed in each range. As the birds gain size and weight they require more room and from time to time are moved into larger pens. By the time they are 3½ months old the pen size is 60 by 150 feet for each 300 birds.

The normal instinct of the chicks at night-fall is to take shelter in the natural cover and Wisconsin nights being what they are at that season it is necessary to round up the chicks and shoo them safely into the brooder houses at the end of each day. One of the most effective ways to drive them out of the heavy cover is to use an old broom; it makes a lot of noise when rustled through the vegetation and will not injure the chicks if they get too close to it.

During their early months of development, the chicks' wings are clipped every ten days or two weeks. On the average, each chick is clipped six times. Raising 10,000 birds each year means that some 60,000 individual clipping operations are performed. Leola and Evelyn handle the clipping and during the months of May, June, July and August they develop a full set of barbers' muscles and bench callouses.

When the second growth of wing feathers will support the birds in flight, at 14 to 16 weeks, the brails are applied. The brail, a Y shaped leather strap placed over one wing, prevents the bird from extending its wing enough to fly. It is used in preference to clipping at this stage of development because clipping would make the birds useless for field trials or restocking.

The birds do not attain full plumage till early fall, some six or seven months after hatching, about the time orders for birds for field trials and restocking purposes begin to come in. For shipping live birds Perkins uses a specially designed cardboard carton or wood crate of his own design. The cardboard carton is waxed inside and out to keep out moisture. Shavings are used on the floor of the boxes as additional protection. There is room for five or six birds in each carton and a divider down the center provides two sections for three birds each.

The wood crates will accommodate up to 18 birds; a divider is used in the crates to provide two sections for eight or nine birds each. Both cartons and crates are designed to permit very little light to enter and have nine-inch ceilings to prevent the birds from injuring themselves if frightened or excited. Were the ceilings higher, the pheasants would jump up and down until they scalped and killed themselves. As an added precaution, Perkins uses a false burlap ceiling in the crates he builds.

Adult birds, when received by the buyer, should be placed in a secluded pen and kept from all excitement. Dogs should not be allowed near the pens, for these high strung birds can easily kill themselves by flying against the pens.

From early November right up to Christmas the Oconomowoc Game Fields staff is busy preparing specially designed and decorated gift boxes of dressed pheasants. Each gift box contains either a brace (cock and hen) or a single bird. The birds are completely plucked except for head feathers, and fast frozen in the farm's own freezer unit. This careful handling preserves the freshness of the birds during shipment to any point in the country.

After Christmas the tempo of activity and the great anxiety which accompanies the rearing of pheasant chicks lessens considerably on the Perkins farm. The older birds are capable of protecting themselves from storms and cold and Perkins finds it unnecessary to eye each new cloud in the sky with suspicion. A distant clap of thunder during autumn nights makes Perkins stir nervously in his sleep, for he remembers one storm that took out his power and left him with 2100 dead chicks. But after Christmas he has a few weeks of relaxation before the eggs start coming in and the hatching season begins.

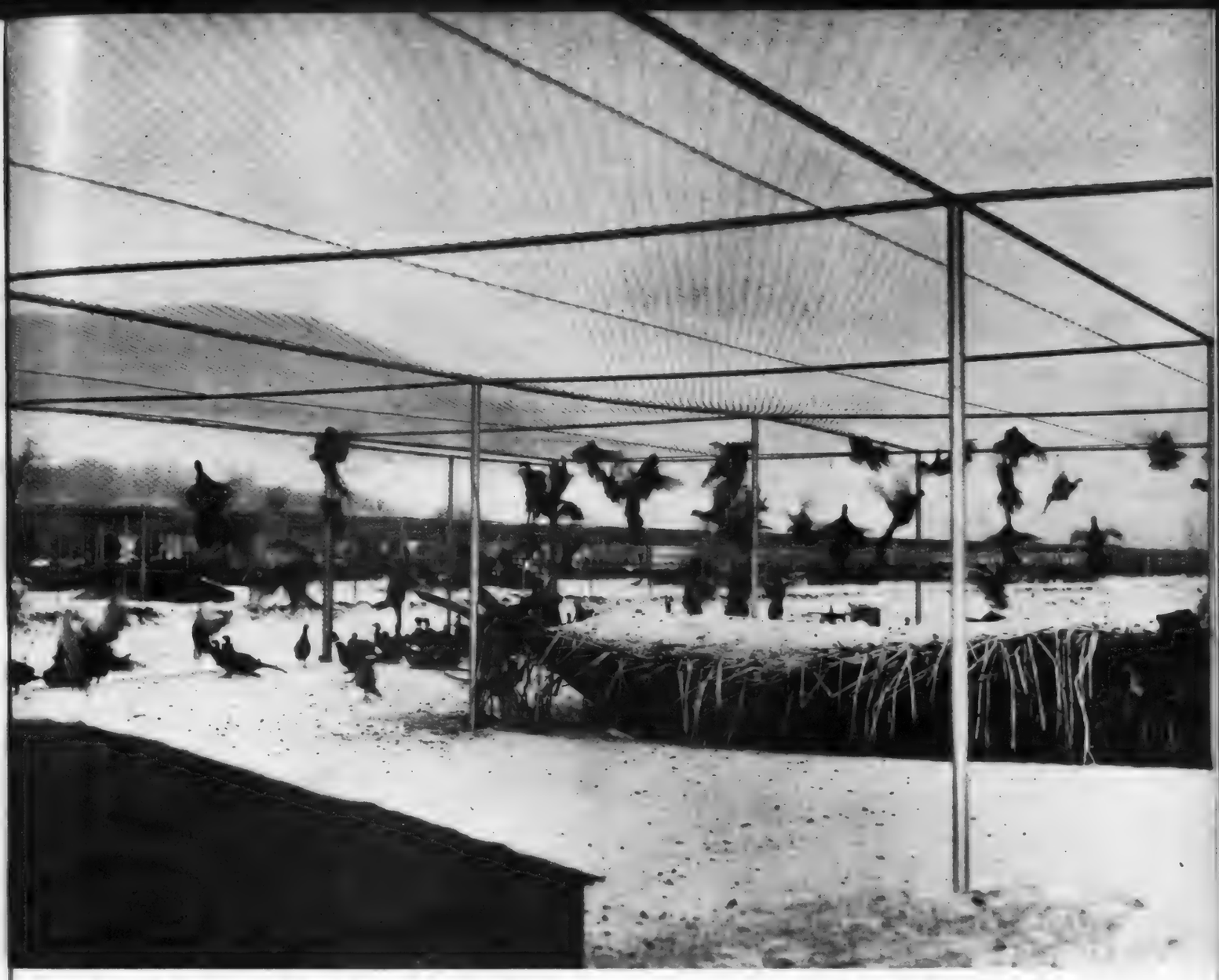
THE BRAIL is a Y shaped leather thong which prevents the spread of one wing. This prevents sustained flight although the bird may be able to top a six-foot fence with one wing in action. If the wing is clipped birds are not suitable for release.

Commercial Breeds

Commercial pheasant raisers producing birds for meat or game (in numbers ranging from a few hundred to as many as 10,000 to 12,000) usually raise only the meat varieties, Blacknecks, Mongolians, Ringnecks, or Mutants. Not only are the meat varieties heavier than the ornamental types but they are hardier and more prolific.

Of the meat varieties, the Blackneck is the heaviest; the Mongolian is a close second. Crossing the Blackneck with any of the other three principal meat varieties produces a bird weighing from ¼ to 1 pound more than the average purebred. This weight increase will occur only on the first cross; any further breeding of the crosses will result in smaller birds. For field trials or restocking purposes, the Ringneck is the most desirable; it is a smaller and somewhat faster flier than the other species.

Many of the small scale raisers, those producing less than 500 birds a year, buy pheasant eggs and hatch them under chicken clucks. G. E. Cooley of Ponca City, Okla., uses Partridge Cochin Bantams; others use heavy setting hens. Bantams will brood 8 to 10 pheasant eggs; the larger chickens cover 15 to 20. Both types will care for the chicks far better than will pheasant hens in captivity. Pheasant hens raised in pens soon lose interest in their chicks and let them fend for them-



A CREEP of corn stalks or hay is sufficient protection even in zero weather. Pheasants prefer tall grass to an enclosed shelter. They are easily excited by a stranger or a dog and might break their fool necks on the wire. They never seem to learn.

selves. While pheasant chicks will stay with their chicken foster-mother for six weeks to two months, it is advisable to clip their wings at about two weeks and place them in separate enclosures.

Commercial raisers find it unprofitable to have pheasants hatch their own eggs. A pheasant hen permitted to hatch her own eggs may lay only one clutch of 15 or 20 during the egg laying season, April, May or June, while a hen whose eggs are taken from her will lay 50 to 70 eggs each season.

Standard incubators may be used if they are adapted to pheasant eggs, which are somewhat smaller than chicken eggs. Dividers or small egg cradles are used.

Pheasant Problems

Whether you raise a few pheasants in your back yard as a hobby, or are in the business for a living, the same problems present themselves; the big breeder just has more of them.

One of the biggest problems confronting the average pheasant raiser is that of providing sufficient range. Luther Kern, Kansas, Illinois, who started raising pheasants as a hobby 6 years ago says. "My greatest trouble is finding enough room for pens and brooding equipment. This spring I am moving to a farm where I will have 80 acres and all the building and pen space I need."

Confinement makes pheasants irritable. Cramped quarters may cause an outbreak of cannibalism. When this occurs they are far more vicious than most birds. Mrs. R. H. Bissell of Ringneck Roost, Keene, New Hampshire, says, "We had a badly wing-picked bird which I took into the house to doctor. This took about 15 to 20 minutes. When I returned him to the pen I found that while I was gone another had been reduced to 50% skeleton. The other pheasants had eaten all of his feathers and half of his flesh." In a serious outbreak completely picked skeletons are frequently found in the pens. Cannibalism may become an acute problem during the breeding season, when the cocks become extremely combative.

Other problems are sanitation, disease, and climatic changes. Some breeders with small flocks use the harem or small pen system as a sanitary measure. Five or six hens and one cock are placed in a movable pen 12 feet square and 6 feet high. The pen is moved frequently to fresh ground. Farmers and small breeders who also have poultry find the pen system enables them to keep the pheasants segregated from domestic fowl.

Pheasants are susceptible to the same diseases and parasites as chickens, coccidiosis, blackhead, gape-worm, pneumonia, lice, and others. If pheasants are to be housed in buildings formerly used for chickens, complete and thorough disinfecting is recommended. Ground used for ranging chickens should be limed before running pheasants on it. Diseases in pheasants are treated as the same diseases in chickens.

(Continued on page 108)

Barley

Barley has a feed value near that of corn and brings a premium for malting. Spring varieties are grown in the north, winter varieties in the south.

BY T. E. STOA

ON a hot July day in 1935 Sam Lykken, a North Dakota farmer, walked through his rust-ruined field of barley kicking at the powdery broken stems. The crop, that looked certain to be a big 'un a few weeks before, was now a mass of mottled withered leaves, shriveled heads, and stems covered with red rust powder. Lykken decided to plow the whole mess under when his eye caught a single vigorous plant among the thousands of stems. He looked at its fresh green leaves, its clean stem without a trace of rust; he held its heavy ripening head in his hand.

Alone in this twenty acre field, one plant had not suffered from rust. Lykken "harvested" this one good head from his field and rubbed out the seeds between his hands. The next spring he planted the best 18 of these kernels in his garden and reaped a cupfull of seed that summer. An invasion of grasshoppers, drought and the tromping stock that broke into the patch almost wiped out the little crop but Lykken stubbornly continued to plant each seed he harvested until, in five years, he was able to produce 1,200 bushels of barley descended from his first rust-free plant.

Lykken sold most of this harvest to the seed companies, but one bag of it he threw into his car and took to the scientists at the agronomy department of the North Dakota Agriculture College at Fargo for testing.

The college tests proved it was rust-resistant, and had somewhat greater resistance to root rot than most other barleys and further, it was an excellent malting barley. Today Kindred (L) is one of the most popular malting varieties grown. It was named Kindred in honor of the town in which Lykken lives; the seed men tacked on the (L) for Lykken to give credit where credit is due. This chance selection developed one more variety of barley to compete with more than 40 new varieties that have been released in the past ten years.

The Ancient One

In ancient Greece it was traditionally believed that barley was the first form of food given to mankind by the Gods, and most botanists and archaeologists seem to agree that barley was one of the first plants to be cultivated. In the valleys of the Tigris and Euphrates and the Nile ancient straw-lined barley storage pits have been found by archaeologists which have been tentatively dated at about 20,000 years old.

Barley's ability to grow where the season is short and the climate cool was a real factor in the northward movement of agriculture. In Sweden and Norway barley is grown as far north as the 70th parallel. In this land of the midnight sun it produces a crop in the short but intense season. On the high plateaus of Tibet it has been grown at 14,000 feet, an altitude that makes even the long-haired, grunting yak short of breath. As agriculture moved north, barley was the pioneer grain.

Years before the Mayflower hove to at Plymouth Rock, small plots of barley were nodding their bearded heads from Nova Scotia to Virginia. Captain Bartholomew Gosnold, of Falmouth, England, is reported to have brought the first seed barley with him when he landed near New Bedford, Massachusetts, in 1602.

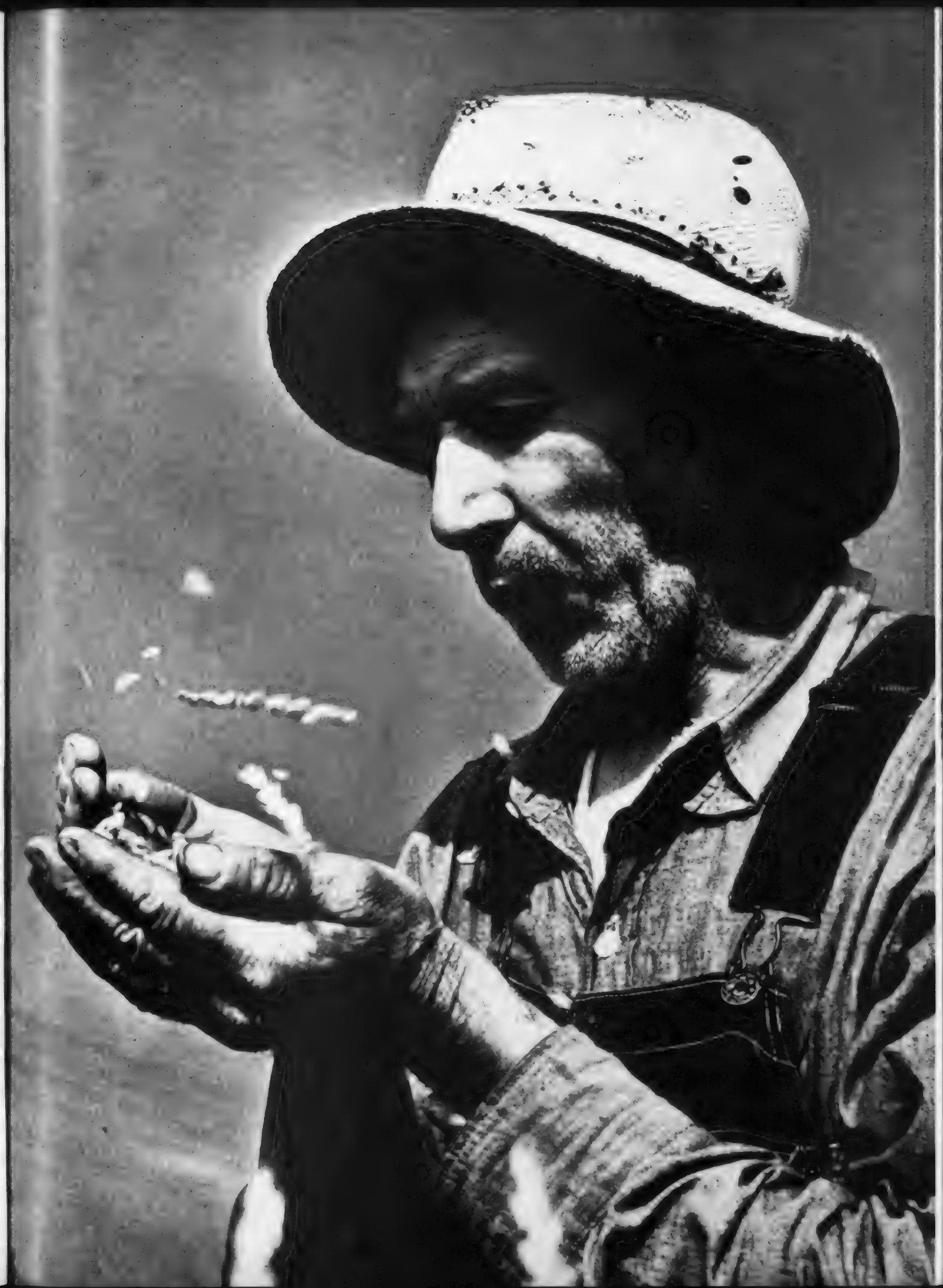
Barley growing moved north and westward as the country was settled; the Spanish introducing it in the far west in the Sacramento Valley. With each generation, almost with each year, the production of barley increased until our experience with the 18th Amendment in 1920.

About a third of the crop was then going to the maltsters to produce brewers' and distillers' malt. But soon new high yielding varieties, and the greater recognition of barley as a feed crop stimulated production. In 1929, we nearly doubled the pre-prohibition acreage and yield.

General Types

The head or spike of the barley is made up of the flowers of the plant which are attached to the central stem in alternating three flower spikelets. These spikelets are attached to the central stem on opposite sides so that at each double joint there are six flowers surrounding it. In some varieties only the center flower of the three-flower spikelet is fertile and produces a seed. This is called the two-row type; its spike has a wide flat look because of the seed produced on each side of the rachis. In the

WHEN BARLEY RIPENS the fields are deep gold and the dry heads whisper in the wind. The farmer rubs the heads between his hands and tests for ripeness by biting a kernel to see if it is hard and mealy.



six-rowed varieties all of the flowers are fertile and produce seed which gives the head a fat, hexagonally rounded appearance.

A second division of barley is made between the winter and spring varieties. Barley has a true winter variety that requires a period of cold between first growth and fruition. These winter varieties will grow if planted in the spring but usually will not head out and produce seed. The spring varieties are adapted to early planting and quick maturing in the northern regions where winter varieties would not survive. The winter barleys are more hardy than the so-called winter oats, but are more tender than the winter wheat. In North America the winter barley region lies south of a curved line running roughly from New York City through Kansas City and western Texas.

A third method used in classifying barley is the division into feed and malting types. The maltsters seek a plump, mellow, kernel, high in its power to convert starches to sugars in the malting process and capable of withstanding threshing without cracking the berry or scuffing the hull. The feed barleys are flintier and usually have a higher protein content. Though malting barleys do very well as animal feed, their yield in some areas is less per acre, and the harvesting is a more careful operation to secure undamaged kernels. The feed barleys are not acceptable for the production of malt.

The Barley Country

In the United States barley is definitely a regional crop. Though it can be grown in every state the great bulk of our barley is produced in North and South Dakota and Minnesota in the Red River Valley; Nebraska; Wisconsin, the malting center of America, and in northern Illinois where the Wisconsin soil and climate seems to overlap; Michigan, in the rich "thumb" area; Colorado; and in California in the the Sacramento and San Joaquin Valleys.

Barley cannot compete with corn, flax or soybeans in climates ideally suited to these crops. But where the growing season is too short, or too cool for corn to mature, or where late summer drought takes its toll of the slower crops, barley is a successful competitor.

Barley As A Feed

More than half of our annual crop of barley is used as animal feed, the biggest part of it being fed on the farms where it is raised. In the area where barley does best, that is, where other crops are handicapped by cool spring weather and a short summer, it produces more pounds of grain per acre than oats or other small grains. Where corn can be grown successfully it will usually yield more pounds per acre. The cost of growing barley and oats is about the same but corn and other inter-tilled crops run 20 to 30 per cent higher. In spite of this higher cost per acre corn is still preferred to barley in the corn belt. In the areas where it thrives, corn is the cheapest feed to grow.

Max Dahl, whose farm and feed lots are located in the barley rich Red River Valley at Chaffee, North Dakota, finds that barley yields more pounds of feed per acre than any other crop that he can grow. "I feed from 60 to 250 cattle and around 250 hogs a year," he says, "and, believe me, they eat up a lot of barley. I like a mixture of grains because the stock seem to clean up their feed more when they get a little variety."

It's Nutritious

The nutritional value of barley, as reported by Morrison in "Feeds and Feeding" (20th edition) might be summarized as follows to show the relationship of common six-row barley to oats and corn:

	Barley	Oats	Corn
Protein	11.8%	12%	9.4%
Digestibility of crude protein	79.0%	78%	76.0%
Total digestible nutrients per 100 lbs. of grain—lbs.	78.7	71.5	80.6

Schneider in his book "Feeds of the World" (West Virginia Agr. Exp. Sta., 1947) estimates that the degree of digestibility of nitrogen-free extract for barley would be 88 per cent, for oats 81 per cent, and 91 per cent for corn.

John Marconi, of Middletown, Ohio, like many practical farmers finds barley a very satisfactory grain for feeding livestock. Marconi says, "My brother and I buy around two hundred pigs a year for fattening and we have a small herd of Guernseys. We feed them both ground barley. I like to feed it about half and half with corn to give a little variety to the feed. I used to soak barley in skim milk for the hogs and they really put on the weight that way, but right now you couldn't even buy a glass of skim milk at the dairy. Another reason I like barley," Marconi added, "is that you get a feed crop in early, and years when we have had a corn failure our winter barley pulled us through."

Practical farmers, like W. A. Ploth of Davenport, North Dakota, who farms extensively and raises cattle and hogs, consider barley an excellent grain for feeding hogs. Because of the hull, slightly more barley is required to produce 100 pounds of pork than good corn, but barley, having a higher protein content, does not require as much protein supplement. Pork and

HOGS FATTEN WELL on barley. Feeders mix barley with other feeds to add variety to the ration. Barley fed hogs produce firm pork and bacon of excellent quality.

bacon from barley fed hogs are firm and of excellent quality.

Dr. Morrison summarizes the use of barley as cattle feed as follows: "In 24 experiments in which ground barley has been fed as the only or chief grain in direct comparison with corn, the average gains of the barley fed cattle have equaled those of the corn fed cattle."

Ground barley equaled corn in feed required for 100 pounds gain in these experiments. The barley fed cattle, however, sold for slightly less than those fed corn. Perhaps the corn fed animals bested them on sleekness of coat due to the higher fat content of corn.

In several experiments ground barley was compared with shelled corn with pigs following the cattle. The barley fed cattle gained .02 pounds a day more and gained 100 pounds on a trifle less feed than those fed corn. However, they brought 13 cents less per hundred-weight and less pork was produced by the pigs following them. These factors made barley worth 88 per cent as much as shelled corn.

Barley is extensively fed to sheep in the northern and western states. With fattening lambs, as with hogs, it takes slightly more barley than corn to produce 100 pounds gain. Alfalfa hay, fed with barley should furnish about all the protein supplement needed by sheep and hogs.

Pigs have never been noted for their choosiness, but they will refuse scabbed barley which cattle and sheep eat with apparently satisfactory results. Infected barley may retard pigs growth or cause a siege of diarrhea and vomiting. Horses, too, will refuse scabby grain.

Feed Variety

In choosing a barley variety for feed, farmers should be concerned mainly with the yield any given variety will make in their area since there is no real difference in feed value of most of the hulled varieties grown. Plant breeders, as they painstakingly open the young barley flowerlet and dust in the pollen from a different variety, are gradually improving the yield. Feebar, whose name indicates its purpose as a feed barley, has recently been released by the South Dakota Experiment Station, has demonstrated good yielding qualities and averages higher in protein than many other varieties.

Feeding Winter Barley

The growers of winter barley have, in addition to their grain crop, an excellent late fall and early spring pasture. The crop is planted sometime between September 15 and October 15. Like winter wheat and rye, barley is subject to attack by hessian fly and so the date of planting should be determined by the fly-free date. As soon as good stools are formed the animals may be turned loose on it. Two weeks before freezing weather sets in the farmers usually take their stock from the pasture in order to give the barley a

ABOVE: Plant breeders, in their efforts to create better types, have added variety to the appearance of barley. The above types show some of the extreme variations that have been achieved, from the beardless Sunrise, on the left; the Missouri Early Beardless, third from left, a hooded variety; to Kentucky I, on the extreme right, with its rough long beard.

BELOW; The hairy stigmas of the barley floret attached to the plump ovary catch the pollen and hold it during germination. The pollen-producing anthers have been removed from these florets. Breeders do this in crossing since barley is self pollinating. The hairiness of the stigmas and the barbs on mature barley go together. This is a rough awned barley.

chance to make a recovery growth. In the spring the barley fields may be used as pasture as soon as the ground is dry until the time unpastured barley begins to elongate and form its stem and spike structure. Joe Davenport, a Kentucky farmer who raises a large crop of winter barley in addition to his cattle feeding program, has gone so far as to say, "When you get both fall and spring pasture for your stock along with a good grain crop, winter barley is just about a stand off with a hundred bushel an acre yield of corn.

"That is not counting the difference in the amount of work between barley and corn either."

Pasture and Green Manure

In the winter barley areas, particularly in the tobacco growing regions, barley is finding an increasing use as a green manure. Barley is sown in the fall with a legume such as vetch or crimson clover. It is used for fall and spring pasture and, during the winter, is of great value in helping to prevent erosion on the otherwise open tobacco fields. In late spring the barley and vetch are plowed under as green manure. Barley is preferred to rye for this use because of the speed with which it disintegrates after it is plowed under and because it rarely produces a volunteer crop later. Tests have shown that the tougher rye stalks lie snarled in the soil longer and lock up enough nitrogen in their slower decay to materially affect the tobacco yield.

In the hill country of the South a rain changes the furrow between the rows of corn into a silty rivulet that may even leave the roots exposed like naked tendons. In the winter, rain and snow continue to rob the bare land of its top soil and leave only gullies. To combat this, winter barley is being recommended as a permanent replacement for corn on land with more than ten per cent slope but not too steep for small grains.

CROSS BREEDING BARLEY requires the painstaking removal of the anthers before they self-pollinate. Pollen from a new variety is then dusted into the flower

Cash For Malting Barley

Though feed barleys are, of course, frequently sold on the market, farmers who are raising barley as a cash crop usually grow the malting varieties in order to benefit by the premium that maltsters are willing to pay for top grade malting varieties. Over the past ten years the top premium paid for malting barley averaged 25 cents more than the market price for feed barley. During part of this time, however, the amount of premium that could be paid was limited by price controls Of course not all malting barley would bring the top premium so the barley grower received somewhat less than this for barley of malting quality. During the past year this premium has gone to as high as 80 cents. At Fargo, North Dakota, during January, 1948 the premium ranged from 66 to 69 cents for the mellow malting barley which the market designated as "choice" and 45 to 59 cents for barley classed as "medium."

The maltsters and brewers have been publicizing the advantages of growing the approved malting varieties through the Midwest Barley Improvement Association, 828 North Broadway, Milwaukee 2, Wisconsin. For the season of 1948 this organization sponsored a contest among the growers of malting barley in North and South Dakota, Wisconsin, Minnesota, Michigan, Illinois, and Iowa. The Association raised $30,000 in prizes to be distributed to the winners of county, state, and regional contests.

Malting

The process of changing barley into malt is simply starting the seed to grow and then stopping it. The result is that the starches, that are stored in the seed to feed it while it is developing its first roots and leaves, are changed into soluble sugars which can be used as foods or used in the fermentation process. The seed converts the starches by the aid of the enzyme diastase and is thus able to change the stored food into soluble plant nutrients. Man takes advantage of this natural process by allowing the change to take place to the point where he can best make use of the sugars and the diastase and then he stops the process. To do this the barley is steeped in water and is then either spread on the germinating floors or placed in germinating drums where it is allowed to form its rootlets and begin the formation of its stem structure. The length of the germinating process lasts 5 to 6 days. The germination is stopped by drying the malt with hot air which in two days reduces its moisture content from around 45 per cent to less than four per cent. The rootlets are removed from the malt by polishing and are returned to the farm in the form of animal feed. A part of the finished malt goes to food processors who produce breakfast foods, malted milk, baby foods and malt syrup, but the biggest part goes to the breweries where the converted sugars are dissolved

into a liquid called wort which is the beginning of beer.

The brewers claim, and very loudly when their supply of grain is threatened, that more than a third of the barley used in malting is returned to the farms as feed and further that this feed has a much higher protein content than the original barley. This by-product is called brewers grain and is fed rather extensively to dairy cattle.

Robert H. Lamb, a barley buyer for Ladish Malting Co. of Milwaukee, describes the features he looks for in barley, "We want an approved malting variety. It shouldn't be a mixture of the malting types and particularly must not be mixed with feed varieties. The barley must be sound, well matured, and should have a hull that has good adherence. Its odor should be a clean grain smell with no trace of mustiness. Well filled kernels of uniform size that are free of any harvesting or handling damage are desirable. Finally, and of overall importance, the kernels must all be capable of the vigorous germination required in the malting process. The Midwest Barley Improvement Association has available lists of the approved malting barleys that are best suited for the various barley growing areas."

Should I Grow Barley?

In deciding whether or not he wants to grow barley a farmer must find out if he lives in a region where barley thrives; whether his soil is suitable for barley; and whether barley is the most profitable crop that he can raise on his land. If the answers to these questions indicate that he should go ahead then he will have to find whether winter barley can be grown in his area or whether he is in the spring barley region. Finally he will decide whether it would be best to raise feed or malting barley. To answer these whether, whether, whethers let's look at some of the factors.

Soil and Climate For Barley

Barley likes moderate summer temperatures and a good, but not excessive, supply of moisture. It can stand hot dry summers or cool moist weather but the combination of heat and humidity will leave it as limp as a wilted collar. It is one of the fastest maturing of the grains and therefore is less affected by late summer drought. Because of its fast growth it requires a well-balanced fertile soil. Well-drained, moderately heavy, clay-loam soil with ample moisture in an area that has a cool growing season is considered ideal for barley. Highly acid soils, sandy soils, or soils which react quickly to drought, are undesirable for this crop. Poorly drained and excessively rich soils produce a rank, lush growth that lodges badly and is more susceptible to disease damage.

CHAMPION BARLEY GROWER, Alden Kolb, won the 1946 Wisconsin barley contest with this Wisconsin 38 barley. His Oderbrucker won first at the 1930 International.

From Alberta, Alpha and Arivat to Wong, Woodward, Woodwin and York the "Classification of Barley Varieties Grown in the United States" issued by the Department of Agriculture lists some 125 recognized varieties. The practical farmer picks his variety on the basis of a number of factors. Whether he grows winter or spring barley will be determined for him by his geography. Whether he grows barley as a feed crop or a cash crop will influence him in choosing a malting variety or a feed type. In many cases he may grow a malting variety with the intention of selling it or feeding it depending on his needs and the price that is being offered. He will certainly take into consideration the experience of his neighbors and the advice of the county agent who understands the local conditions.

Herb Gettel, who, with his three oldest boys, grows barley in the rich "Thumb" area of Michigan, describes a change he made. "We had been having considerable trouble with shattering with our Wisconsin 38. Every year, when the barley ripened, we'd lose a lot of heads because the thin goose neck that connects the head with the stalk would break." Gettel paused to sketch the head and neck of a stalk of barley to illustrate the weak point, laughed at his art work, and then continued. "In 1944 when the new Bay barley was released we got enough foundation stock to plant five acres right beside our field of Wisconsin 38. When we harvested you could have gone out into the fields blindfolded and told where each of the varieties was planted simply by touching the ground and feeling the Wisconsin heads. Since then we have raised only Bay and it has done very well."

In the Red River Valley where much of the malting barley is now grown, Kindred (L) has, to a large extent, replaced the potentially higher yielding and once popular Wisconsin 38.

Seedbed

Barley needs a firm seedbed but one that is not too hard or too tight for water

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THIS DOCK met its death in a mist of 2,4-D. The top picture was taken just before the weed was sprayed. Four days later it was a mass of twisted stems and distorted leaves. 2,4-D destroys the orderly systematic growth processes of the plant cells.

Death to WEEDS

BY DR. MYRON S. HAZEN

Chemical weed killers promise farmers greater profits and less cultivation. 2,4-D is still the outstanding killer among a host of chemicals coming from the laboratories.

WHEN rain fell late into the summer of 1947 throughout most of the Midwest, the corn crop suffered, but the weeds did well. The weeds did so well that they choked the corn on thousands of acres, and farmers saw the dim prospect of empty cribs for the winter. This ill wind did blow some good, for it brought 2,4-D, the warborn chemical weed killer, to the attention of the public. It leaped to fame and many rank it with hybrid corn as an outstanding agricultural development of the last quarter century.

When the weeds grew so fast that they began to choke the corn, farmers had no weapon against them, for rains fell and they couldn't get the cultivators out of the barns. Willing to try anything that looked promising, they began to ask about the new chemical weed killer, and many of them, rather than hand over their crop to weeds, called for airplanes to spray vast acreages. The idea was new and farmers kept their fingers crossed, but the weeds began to wilt and die, and the corn, freed of its competition, made a good harvest. In Henderson County, Kentucky, alone there were nearly 20,000 acres of corn sprayed and much of the crop that would have been a total loss produced an average harvest.

The weather was not the only ally the weeds called up. The shortage of farm labor left many fields uncultivated and the weeds moved in. 2,4-D saved two million dollars worth of corn in Henderson County in 1947.

John Pfingston, one of the Henderson County farmers who pioneered in the use of 2,4-D on corn in 1947, is satisfied that the chemical will cut costs and labor. He sprayed 125 of his 350 acres of corn with the butyl ester of 2,4-D. The cost was a dollar an acre; hoeing would have cost four dollars. The part of his corn crop that wasn't treated with 2,4-D yielded 66.8 bushels to the acre while the treated fields yielded 86.80 bushels. "Beside that," he said, "when you hoe weeds they keep coming up, but when you use 2,4-D it knocks them for a season. It looks good to me. You just show the can to a horseweed and it passes out."

2,4-D is a war baby. During World War II the army became interested in compounds that might destroy enemy crops. By 1945 it had large supplies of 2,4-D stored in convenient locations. The army's interest helped speed up the development of the chemical. A mere handful of research men had done the preliminary work on this growth regulating hormone, but with the close of the war research men all over the country pitched in until 2,4-D has become one of the most worked on chemicals in recent times.

Chemical weed killers, with promises

A JEEP equipped with a low pressure tank and fan shaped nozzles can spray pasture fields at five to 10 miles an hour. The 2,4-D treatment lasts a season, costs only one to three dollars per acre.

IT'S EASIER to control lawn weeds with 2,4-D than with the hoe. One ounce of 2,4-D acid will treat 3000 square feet of lawn. It will not kill common grasses, but drifting 2,4-D may kill your own and your neighbor's ornamentals and garden crops.

of bigger crops and less work, fill a need on the farm. If we rule out the weather farmers still must contend with three powerful forces — weeds, insects, and disease. Plant diseases and insects have long known the bite of products from the chemist's laboratory. Now weeds are also finding their strongest foe in the chemist's concoctions. Mechanical cultivators and weeders may become unimportant tools on the American farm. Even the long handled hoe, that has made callouses on the hands of farm boys for centuries, may become a museum piece.

2,4-D, however, is already sharing the spotlight with a flock of newer and promising chemical weed killers. There have been more than 1600 compounds and mixtures studied in the search and new ones are being tried constantly. Economy is the slogan in this large scale search, for the best estimates are that each year we lose three billion dollars to weeds that attack crops, choke waterways and damage livestock and right of ways.

2,4-D is non-poisonous, non-corrosive, will not explode and is non-inflammable. Its toxic effects upon the soil disappear quite rapidly, and no cases of permanent soil sterility have occurred when suitable methods of application and proper dosage recommendations are followed. The amount required per acre of the commercial acid, its salts or esters, is relatively small. Only limited quantities of water are required, and it lends itself easily to concentrated spray mixtures, thereby reducing the expense of the application, particularly on large acreages.

It has a sharp, musty odor which clings to the hands and clothes. However, it has no harmful effects on man or animal.

From a high-cost laboratory specialty, this material has graduated into a mass production article of commerce, produced so cheaply that an acre can be treated at costs ranging from one to five dollars. In many states from 15 to as high as 50 different organizations are marketing either the commercial 2,4-D or its various compounds.

In its original form it is a white powder not readily soluble in water. To get it in a form that can be used in a sprayer and diluted with water it is changed chemically to salts or esters. It is these forms that can be purchased at supply houses, hardware and cooperative stores under dozens of trade names.

Regardless of the name under which it is sold or the form in which it is packaged, it is a hormone that regulates the growth of some plants. It changes the rate of growth in the cells of these plants and often deforms them. There is no immediate effect from the 2,4-D. It may take the plant a week to die completely. The stems slowly curl and thicken, the leaves twist, turn yellow, grow brittle, and finally die. They grow so brittle that they snap off when touched.

The commercial weed killers vary widely in the amount of actual 2,4-D (acid) which they contain. Generally speaking the actual amount of acid contained in the weed killer is a fair indication of its efficiency. There are four general groups of 2,4-D used in weed control:

1. The acid 100% 2,4-D.
2. Metallic salt, of which sodium is the most common, 84% 2,4-D acid).
3. Amine salts 60-68%.
4. Esters, which vary from 76% in the amyl ester to 94% in the methyl ester.

Crop plants are most likely to be injured by the esters. These are oily in character and make an emulsion when mixed with water. The esters are, however, more effective when the soil and weather conditions are extremely dry.

A large number of the common weed killers furnish their 2,4-D acid content in the form of sodium salt, which is a mixture of 2,4-D acid and sodium carbonate, or sodium bicarbonate. This material is difficult to dissolve in hard water. The amine salts on the other hand are already combined with one of the alcohols and are readily soluble in water.

How It Works

The amazing thing about 2,4-D is that it will kill some plants and leave others unharmed. This selective ability permits its use to kill weeds in crops that are not damaged by the hormone.

Generally speaking 2,4-D will kill the broad leaved plants but not those with narrow leaves, such as the grasses. Apparently it penetrates more readily those leaves that are broad surfaced, but no one is quite sure why this is so.

The following lists, prepared by the North Dakota Agricultural College tells where 2,4-D can be safely used.

Crops, Ornamentals and woody plants:

Easily killed or severely injured:

Sugar beets; Soybeans; Alfalfa; Sweet clover; Other legumes; Peas; Tomatoes; Most Vegetables; All fruit trees; Most bush fruits; Broad-leaved shrubs; Beans; Flowering ornamentals; Creeping bent grasses.

Less easily killed or injured:

Flax; Corn; Sudan grass; Sorghum; Potatoes; Buckwheat; Milets; Strawberries; Rhubarb; Asparagus; Grapes; Gladiolus; Iris; Tulips; Elm; Willows (species variable).

Generally not easily injured:

Oats; Wheat; Barley; Rye; Brome grass; Wheat grass; Blue grass; Red top; Reed canary grass; Fescue; Timothy; Pines; Cedars; Spruce; Ash; Raspberries.

Weeds

Generally easy to kill:

Annual sow thistle; Beggar's tick; Burdock; Chickweed; Wild lettuce; Loco weed; Mustards; Pigweeds; Plantain (common); Cockle bur; Dandelion; Smartweed; Ragweed; Russian thistle; Sunflower (annual); Cotton.

Harder to kill:

Canada thistle; Carrot (wild); Dock; Morning glory; Field bindweed; Horse tail; Lamb's quarters; Plantain (buckhorn); Poison ivy; Shepherd's purse; Sow thistle (perennial); Sumac; Sunower (perennial); Wild buckwheat.

Generally not killed:

Asters; Corn cockle; Foxtail; Goldenrod; Wild oats; Quack grass; Horse nettle; Milkweed; Wild rose; Barnyard grass; Sandbur.

How To Treat Crops

2,4-D is not a cure-all. It will solve some weed difficulties but even when it works there are a host of problems and warnings involved. It acts differently on every crop. It cannot be trusted to have the same effect on different varieties of the same crop. Some varieties of flax, for instance, can be treated with 2,4-D without harm, while other varieties die quietly along with the weeds.

Research men, busy on test plots and farms across the nation, are trying to learn how the chemical can best be used on each of the crops for which it shows promise. For every rule they can set down there seems to be an exception.

The scientists have, however, worked out some general rules for the use of 2,4-D on certain crops. The following information is a collection of the latest recommendations. In every case where these methods are used they should first be checked with county agricultural agents or state experiment stations that know the problems of the locality.

Pre- and Post-Emergence

Two types of spraying have developed with chemical weed killers. These are pre- and post-emergence. Post-emergence is spraying after the crops are up. Pre-emergence spraying is done after the seed is planted and before the crops come through the surface. Pre-emergence spraying has proved workable, especially with corn, where it promises to remove much of the cultivation from the crop when we know more about the results and limitations. No state recommends it yet.

Pre-emergence spraying requires higher rates of application than spraying after the crops are up, but the best rates have not been learned for each crop. It doesn't work on stony or cloddy soils and does better on heavy soils than light. When applied to the soil 2,4-D, will kill the germinating seeds of such pests as crabgrass, bullgrass and knotgrass. The seeds in the upper portion of the soil are killed and those in the lower levels will not germinate.

Climate and Soil Have a Bearing

The weather effects the value of 2,4-D applications and is one of the variables that must be considered in planning a spray job. A thermometer reading of 50° to 90° is best, for either extremely low or extremely high temperatures seem to interfere with the chemical's weed killing power. A rain immediately after treatment with the sodium or amine salt forms will wash part of the chemical from the plants before it is totally absorbed. The esters, however, are oily and can stand a rain that falls even a few minutes after spraying. Dew on the vegetation can cause sprays to be diluted and result in excessive run off. On the other hand, it is good to use 2,4-D dusts when there is a light dew for it helps make the weed killer stick to the plant and be more rapidly absorbed. A dry soil can lead to disappointing results because the weeds are not growing rapidly. This has caused unhappiness among some farmers in the great plains regions where much of the summer is normally quite dry.

Corn and Sorghum

Throughout the cornbelt a dozen hard-working research men are trying to make the rocking chair a successful location for the corn grower. The trials have not all been successful, but in general they indicate that on many varieties 2,4-D applied just before the corn is "laid by" will control a large part of the late season weeds.

Research workers at Iowa State College are blazing new trails. Here's a brief summary of their recommendations:

Apply one-half pound of the 2,4-D acid in spray to each acre. Or you can use one-fourth pound of the ester forms. Read the label on the container you buy to find out if it is an ester, amine or salt. Spray when the corn is one to three feet tall.

At this stage sprayings can be made either with the regular nozzles that distribute 80 to 100 gallons per acre or preferably with mist nozzles that distribute 5 to 10 gallons per acre. In the later sprayings the mist nozzles should be used. Set the nozzles to spray the corn or sorghum as little as possible.

Small corn, six inches or less in height, is more easily damaged by 2,4-D than

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BRACE ROOTS on the corn plant on the right were stunted by an overdose of 2,4-D. The "wonder" chemical can cause serious crop damage when directions are not followed. Pre-emergence spraying is the most promising new development for corn.

WINTER QUARTERS for hogs are often dungeons which unhappy porkers share with filth and parasites. This sad sow recalls the clean clover pastures she knew in summer.

Wintering Hogs

Hogs can turn a profit in winter as well as summer but, they need more care and know-how from their owner.

"WHEN a fellow starts giving his ideas on the winter care of hogs," points out Walter McMechan, Union County, Indiana, hog farmer, "he's going to find a lot of people disagreeing with him, since everyone seems to have his own methods. But even if they do have different ideas on handling hogs in winter," McMechan adds, "they seem to make out all right. You have to take the important things that have been learned about hog handling and fit them to your own farm. Some of them won't fit; some work fine."

Actually, hogs can be as profitable in the winter as they are in the summer. The experts agree that hogs can be a year around business if the hog owners are willing to take the trouble to do the job right in winter. Joel S. Coffey, swine expert of the Ohio State Uni-

versity says, "There's no reason why hogs won't do well in winter; at a somewhat higher cost they can do as well in winter as summer if they are managed right."

It's during the winter months that the hog farmer finds out how much he knows about raising hogs and what luck has to do with it. With the coming of cold weather, which in the Midwest is usually about November 15, the pasture is gone for the year and all the needs of the hogs must be supplied by the farmer. The animals have to be protected from the elements. In short, the health of the hog population depends on the care they get from the farmer without much benefit from the kindness of nature.

To get a closer look at the guiding factors in the wintering of hogs let's look at the problem one part at a time. Sows and bred gilts pose a different problem than either market pigs or boars.

Take Care Of The Sow

Brood sows are specialists. On their shoulders rests the responsibility of turning out healthy pigs in big numbers. Sows that are to handle this job efficiently need wise management. They need proper food and shelter and protection from disease and infection. If any one thing can be considered most important in wintering sows, it is the feed they get.

Farmers who have raised hogs for some time realize that when they feed pregnant sows or gilts they are also feeding the unborn pigs. They know that the care of pigs starts not at birth but at conception, and that through the mother's body the unborn pigs must get the minerals and vitamins they need for the building of strong bodies and bones.

The basic part of a good winter ration for sows and bred gilts should be grain mixtures and good quality alfalfa hay. The hay cuts down the amounts of concentrates fed and keeps the sows lean and efficient. Hay can be fed either in racks or scattered on the ground where it will force the sows to take exercise.

Brood sows should be fed more bulk in proportion to the fattening feeds than should market hogs. The extra roughage can be supplied through additions to the diet of chopped alfalfa, oats, bran, clover or soybean hay.

Following are a couple of popular hog menus for bred sows and gilts, during their 110 to 117 days of pregnancy. When used as a basis for feeding they can be varied in accordance with the feed available and the conditions of the animals.

No. 1

Good leafy alfalfa hay, free choice
1 bu. yellow corn
1 bu. oats
10 lbs. mixed protein supplement
2 lbs. minerals

No. 2

50 lbs. yellow corn
25 lbs. oats, wheat or middlings
13 lbs. alfalfa meal
10 lbs. protein supplement
2 lbs. minerals

100 lbs. total

Pregnant sows need about 1.35 to two pounds of grain mixture each day for every 100 pounds of weight. Bred gilts need more, usually about 1.85 pounds per 100 pounds of body weight. Another good general rule to guide the hog feeder in giving his pregnant animals the proper diet is to allow the sows and gilts to gain about 75 pounds during pregnancy. No definite rule can be made to guide in feeding all pregnant sows and gilts. The final analysis rests on the farmer, for feeding must be controlled by the age and condition of the animals. When the sows look too thin they need more grain feeds, and if they start to get fat they need less grain and more bulk.

Sows should be hand fed to enable the farmer to vary their diet in keeping with the needs of his animals. During the first 10 weeks of pregnancy only 20 to 25 percent of the growth of the pigs occurs within the sow. But during the last six weeks the other 75 to 80 per cent is completed. "So," one swine expert points out, "if you're ever going to slight the sow on feed don't do it during the last weeks of pregnancy.

Housing Also Important

Another important point in the winter hog program is the proper housing for

WINTER MARKET HOGS, should get a clean feed lot and concrete floors if possible. During winter months they get little sunlight and no pasture. To fill the gap the farmer feeds them all the concentrates they will eat and little if any bulk.

pregnant animals. A good farrowing house should measure 6 x 8 feet inside dimensions. This is especially important if the houses are to be used later for housing fattening stock. Adequate room helps keep the sows comfortable and aids in preventing the mashing of young pigs.

A sleeping shed should be tight on three sides and fitted with doors and provisions for ventilation on the south or east side. The ideal winter temperature is 40 or 50 degrees above zero and the body heat of the hogs helps keep temperatures suitable if the houses are tightly constructed. Corn shocks or straw banked on the sides of hog houses are good insulation. Provisions such as hinged tops should be made for proper ventilation. An L-shaped wing in front of the doors helps protect the sows from winter winds and cuts down the chances of flu and pneumonia. The animals should always have six or eight inches of straw or other bedding that is changed when it gets wet or matted with filth.

The location of the shelters can play an important part in the health of sows. Houses should be about 100 yards from the spot where the sows are fed. This forces them to take exercises going to and from the table and exercise is one of the doctor's orders for pregnant sows. Fat sows are not good mothers and exercise will help keep them lean. Unless she is forced to exercise, a sow, by nature of the brute, may become so lazy she has to lean against the fence to grunt.

All successful breeders recognize the importance of exercise for pregnant sows. Vertal Dwyer of Hamilton County, Ohio. says, "I drive 'em outside in the winter time and around the lot a while just to make 'em exercise. We have to feed in the barn here so exercise is quite a problem, but it's still very important." At Conner Prairie, one of the largest hog farms in Indiana, sows are kept in yards that measure 500 x 15 feet, with feed at one end and shelter at the other.

Hogs, like most stock, require plenty of fresh water. Hogs that are slopped usually get all the water they need through their feed. They will drink more water in freezing weather if the chill is removed. Farms with large herds often cut down their labor by installing fountains equipped with lamps to prevent freezing.

The Sanitary Sow

Hogs are clean animals if given the chance to be clean. It is especially important that the sows are given this opportunity for cleanliness, for on their freedom from disease and filth depends much of the success of the pig crop.

With large groups of brood sows a basic element in the sanitary program is separation of the houses into small groups. For instance, with 50 sows the houses could be divided into five groups each. This helps keep any infection that shows up on the farm from spreading to the entire herd. The houses can usually be arranged to accomplish this and still permit speed in feeding and watering. On the side of prevention also is listed dry, well-ventilated houses, and uncontaminated pastures and feed lots. Hogs should be on clean pasture each year and not returned to a field until the normal three or four year rotation brings the field back into pasture.

Soon after the first killing frost, hog growers plan to move their fall market pigs up from the pastures and into the feeding lot. The aim of the owner is to help his market pigs add pounds as fast as his knowledge and available feed will permit.

The most important factor in rapid production of pork is the diet on which the pigs are fattened. A well balanced ration is one that will produce growth and finish in a minimum length of time. The ration should be adequate in energy producing carbohydrates and fats and body building minerals, proteins, and vitamins to supply all the pigs' growing needs. Grain mixtures, alfalfa meal and mineral mixtures fed free choice will supply these needs. As one central Illinois farmer remarked, "The inventor of the hog didn't give 'em stomachs equipped to handle a lot of roughage and bulk. That's the reason we can take advantage of their ability to turn concentrates into pork and fatten fast."

Cereal grains such as corn, oats, wheat and barley or products from these grains should form the basis of the complete ration. The cereals must be supplemented with a complete protein. This is especially important in feeding young stock, for young pigs need protein for building healthy bodies. Minerals especially calcium and phosphorus are essential parts of the feed picture. It is often a lack of minerals and vitamins in the hog diet that causes weakening of hind quarters and the prevalence of "downers" in some herds.

A simple but efficient mineral mixture is made by combining two parts finely ground limestone with two parts steamed bone meal and one part common salt. To each 100 pounds of this mixture add three pounds of iron oxide. Alfalfa hay or meal supplies minerals to hogs but a mineral mixture like the one outlined here is expensive and provides assurance that your hogs are not being shorted on these essential elements. The mineral mixture can be self fed or two pounds of minerals can be mixed with every 100 pounds of grain feed.

Young animals make more rapid growth on a given amount of feed than do older animals. This enables the owner to turn his feed into the most pork while the animals are young. Morrison reports in "Feeds and Feeding" that hogs from birth to 100 pounds consume 304 pounds of feed for each 100 pounds of gain. Pigs from 100 to 200 pounds require 350 pounds of feed to add 100 pounds of meat and those from 200 to 300 pounds must eat 415 pounds to add the same amount of weight. Hogs 300 to 400 pounds require 470 pounds of feed and those from 400 to 500 pounds add 100 pounds of weight when they eat 510 pounds of feed.

Pigs that are preparing for a trip to the butcher should get all the feed they will eat. Growing pigs can be either self-fed or hand-fed and the decision rests with the farmer. If they are hand-fed, they should get all they will eat in a half-hour both morning and evening. Although some farmers still hand feed their market stock,

THESE FALL PIGS will be happy in the farrowing house until weaned or moved to the feed lot. The sows can pass the winter in the farrowing houses which are tightly constructed, but easily ventilated. Pigs should be moved in to lots by November 15.

COME SNOW or zero weather the bred sows and gilts should still get out and around, for exercise builds healthy brood stock. Fat sows are not the best mothers. These producers have warm shelters but they have to take a walk for their meals.

most of them prefer self feeders which have definite advantages. If self feeders are used, the hog can balance his own diet and relieve the farmer of the responsibility.

The self feeder is a labor saver. You fill it once every few days, then give it daily inspection to see that feed is dropping down properly. You can check a dozen feeders in as many minutes if they're in the same area. The self feeder can be profitably used for nearly all types of swine feeding if proper care is given to the contents of the feeds that go through it. It is especially important for fattening stock since the animals can eat as much as they like and as a result add pounds faster than if they are hand fed. It is difficult to lay down rules that will guide in feeding market hogs in all sections of the country, and for hogs in varying conditions. A few guide posts can be mentioned, however, as elements in feeding that will help in mixing the best feed for your hogs. In mixing a hog ration you have to consider (1) balancing the ration, (2) palatability, (3) keep fiber content low for quick fattening, (4) adequate amounts of minerals and vitamins, (5) low content of feeds that form soft fat such as soybeans, and (6) the cost of the final feed in relation to the expected price of pork.

Kansas experiments have shown excellent results from feeding corn, tankage, and alfalfa free choice. Thrifty pigs fattened on this ration can be expected to gain about one and a half pounds daily.

Shelter For Market Pigs

There is no standard design for hog houses, but there are certain elements that should be incorporated into any house for growing pigs. First of all, the winter houses should be dry to help protect the animals from pneumonia and colds. Plenty of good clean bedding will help add to the hog's comfort and the raiser's profits. The house, the same as the sows' houses, should be free from drafts yet adequately ventilated. If cold winds whip through the hog houses the young pigs tend to pile up in those sections of the shelter that are free from drafts. This can kill or cripple young pigs. The old ounce of prevention in this case is more effective than a vale of tears afterwards.

Hogs will not be too crowded if, during their fattening period, they have at least 100 square feet of floor space for every five to seven animals. Crowding them is risky.

Coupled with the housing of growing pigs is also the old problem of keeping pigs in sanitary quarters. Look the animals over critically once in a while to see if they are supporting a crop of lice. A good saturation with a solution of used motor oil and dry lime sulphur like that used for dormant fruit tree spray will kill these little parasitic visitors and give the hogs more time to concentrate on eating and adding weight. By keeping watering troughs, feeders, and houses clean the hog farmer can help guarantee his animals freedom from disease and infection. Internal parasites, neccro, enteritis, and a host

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Now In Autumn

SEPTEMBER: Now in late September the apple sweetens and swells upon the bough, the yellow pumpkins glow in the fields of ripening corn and in the fields and barn, animals begin to fill out with their first winter fat. The grains are in the stack and dry in the bins, and the hay is in the mow.

September is a strange and restless month, an in-between month. The crops are planted and cultivated, and man waits for the harvest. The time of great toil is over and there is only the gathering and storing before the winter comes. Yet there is a strange restlessness, too, for there is fear, rooted deep in the past when man and animal feared hunger and cold and the uncertainties that winter brought. Man watches and waits, and saves more than he needs. Animals are abroad day and night, pressing against time to store food or fat for the lean months. The skunk raids the garbage can, the porcupine leaves his accustomed haunts to stuff himself with the apples hidden beneath the orchard grass, and the squirrel fills his storehouse.

Pastures are brown and bare and the stock are given a few extra ears of corn each day. The cutters shock the rustling corn. Clouds of dust trail the drills across the fields after the corn is harvested, putting in the winter wheat. The farmer's wife searches her kitchen garden for a late tomato or a head of bursting cabbage.

With the first cold rains of fall there is sound of hammer and saw as sagging doors are made secure and the siding on the sheep pen is made tight against the snows. The manure pile back of the barn is hauled to the field that will be in corn next spring and the Canadian thistles are grubbed out of the meadows. Rye and barley are planted for winter cover. Pastures are given a ration of lime and fertilizer to bring them up lush and green in the spring.

Just before the danger of the early frosts, turnips and carrots and late cabbage are taken up and carried to the root cellar, or buried under an insulation of corn stalk, straw and two feet of earth in the garden. There are skimpy meals for most of two days while the women make sauerkraut. The cabbage is brought in from the garden in baskets, trimmed, and washed. Neighbor women help, taking turns at cutting and packing in ten-gallon earthen jars. The heavy jars are carried to the cellar where in course of time nature's chemistry will work the change that

THE YELLOW PUMPKINS, ripening among the corn, are gathered at the first frost. Chopped up with a corn knife, they are a welcome change for the family cow and the pigs. Choice specimens are carried up to the attic for the Thanksgiving pies.

THE AUTUMN SUNSHINE seems to add something to the flavor of applebutter made in the open in a copper kettle. The gourd dipper and the earthen jars are ancient symbols; the mechanical peeler was invented by a man to speed woman's work.

makes sweet, crisp cabbage leaves into the sour, malodorous delicacy.

Spring pullets start laying and some which show no promise are culled out and sent to market. To the joy of the men folk there's an orgy of fried chicken, sometimes in the middle of the week. Late bred sows throw litters and there's some trouble keeping the young pigs from chilling during the frosty nights. Horse traders call to pick up the aging animals that will be replaced in the spring by two-year-olds. Perhaps these will be broken to harness this winter at the sleds, which is safer than an implement if one of them happens to be too spirited.

When the pastures get short the Jersey cow's spring bull calf will be hauled off to the butcher. It won't pay to put grain into it and what little fall grass there is should go to the milking cows.

School opens late in the month and the new teacher finds a room with a family near the school house. The kids grumble as they force their reluctant feet into unaccustomed shoes, but they are happy at the prospect of seeing old friends again. They trudge off, with their lunch boxes and new copybooks and slates, starched and stiff in their school clothes. Mothers welcome their absence after a summer of having them under their feet all day. A new schedule of after-school chores gets off to a bad start and it will take a deal of training before the woodbox is filled and the chickens fed and watered on time.

When the Rhode Island Reds and the Plymouth Rock roosters are beginning to crow and their legs are thick and long, there'll be chicken suppers at the church and the Ladies-Aid Society will have a social to pay for a new aisle carpet. The women serve the chicken and potato salad, the cake and ice cream; some of the men stand in the darkness outside the church door, talking crops and perhaps doing a little surreptitious trading.

The first spelling bee of the season packs the community into the school house and little Lizzie Perkins, eighth grade prodigy, spells down Miss Luella Jameson, spinster who has been the perennial champion since she was in the eighth grade herself. The air becomes heavy with the fumes of the oil lanterns loaned for the occasion. Tired men and women, squeezed into the narrow seats, nod and doze, soothed by the monotones of the spellers around the walls.

AT THE FIRST COLD SNAP sharpened appetites call for the fresh meat delicacies of a home-butchered hog. Heading the list are sage-flavored sausage, knuckles in spiced vinegar, head meat cooked with corn meal, and jerked tenderloin fried to a golden brown.

OCTOBER: Then comes October, the brightest and the saddest month of the year. There is a clear cold night and a sharp frost and the next day the trees along the creek in the valley sketch a line of color across the countryside. Mist appears over the far hills. The sere and yellow leaf scurries along in front of the cold winds and the cricket comes in from the field to his snug harbor on the hearth, and a family of mice moves into the attic.

Now is the time to dig the potatoes and pick the apples, for killing frosts are in the offing. The ground under the big walnut tree at the edge of the woods is covered with nuts and the first Saturday the kids will fill burlap sacks and bring them to the house to husk on the chopping block in the barnyard. The shellbark hickory nuts are falling out of their shells and there's a quart or more every morning for the picking. Grandpa brings in two baskets of wild grapes and mysteriously disappears in the cellar to make his own brand of tonic.

And now comes applebutter making, an event of great importance to the women of the household and one of some complexity. Applebutter must come after the cider is made, for cider is a very necessary ingredient of good applebutter. Sometimes the peeling is done by hand with a paring knife, sometimes the family is fortunate to own a mechanical peeler. Great quantities of apples are peeled, quartered, and washed. Then the small boys in the family build a fire under the big copper kettle and the cooking starts. There is endless stirring and tasting. This is a two-day job and before the last of the butter is ladled into earthen jars for storage in the cellar, the whole family is happy that applebutter making comes but once a year.

There is the canning, too, mostly the late fruits. A delicate spread, familiar to our grandmothers but almost unknown now, was made in late October from quinces and apples, diced and boiled in sugar in equal amounts of apples, quinces and sugar. The choice ears of sweet corn, left on the stalk to dry, are tied in threes and fours and hung up in the shed to be out of the way of the rats and mice. There'll be parched corn with butter and salt on winter evenings. Pumpkins are carried to an unheated room under the eaves and will last for pies until well into the winter. The prolific Kiefer pear tree is stripped, the fruit wrapped in newspaper and spread out on the attic floor. These too, will last until after Christmas.

The men have not been idle. Harvest machinery is oiled and painted and stored snugly in the sheds; the hogs and cattle are brought in from the pastures and pens and feed bunks are repaired near the barn. A routine of feeding is started and grain carted off to the elevator to be ground and mixed. The floodgate on the branch is anchored against winter rains and a load of gravel dumped into the mudhole under the barnyard gate. The strawberry plants are covered with a mulch of straw and the window pane in the kitchen door, broken last spring when the hired hand stuck a ladder through it, is replaced. The nights grow longer and the fire in the kitchen range is kept burning until bedtime.

Now comes Hallowe'en, a season of dread and watching for those who have outside plumbing or gates which can be

in the pumps are opened to forestall a solid freeze. A new grate is ordered for the base burner and the cat is penned in the corncrib over night to discourage an invasion of field mice driven in by the cold. Straw and leaves are packed around cellar windows.

And now the trees are almost bare and the leaves are ankle deep in the woodlot and the angles of the rail fences are blown full. A haze falls over the sun and the hills are hidden in a smoky mist. The days are warm and nature and man bask in the false promise of Indian Summer. Wild geese point their V's southward, high in the heavens, and the smoke rises straight from the chimneys in the frosty mornings. Then one day the clouds bank against the western horizon. The wind comes up and the sun winks out and the cattle, seeking the last grass shoot in the bare meadow, turn their rumps to windward. A cold driving rain, laced with sleet, comes out of the northeast. A mother hen, with a late brood of half-grown chicks, stands dripping under the eaves of the barn and scolds at the unkind ways of nature. Father winces as his bare feet strike the cold floor in the morning, and he tarries not, building the fire in the kitchen stove with great clatter and speed. The kids cover their heads with the extra quilt and dire threats are needed to spring them from their warm nests. Winter is making its first bid.

The men scan the sky and carry the butchering tools out of the smoke house. "After this blow it will turn crisp and cold," they

THE COUNTY AGENT is called in to add his learning to the old farm methods of culling the farm flock of the loafers and aged hens. The huckster picks up the culls on his weekly round.

lifted from their hinges. Bands of small boys, with a sprinkling of tomboys in their midst, roam the countryside, waking the dog in his kennel and the rooster on his perch, and startling grandpa out of his nap beside the stove. Goblin faces leer at the dark windows and the corn rattles off the window panes, for the kids make the most of their brief freedom from the rules of proper behavior. Hallowe'en night itself is preceded by corn night and cabbage night and tic-tac night, and were it not for parental restraint, the season might stretch on into weeks of guerilla warfare against the grown-ups.

There is a husking bee on the barn floor. Cider and baked beans and doughnuts are served and the most bashful swain of all finds the red ear, and blushes as he kisses the prettiest girl. There is a time of courting; buggy rides behind the old white mare with the harvest moon high in the heavens, the echo of a baying hound floating across the purple meadows, and the whippoorwill calling from the hedgerows.

NOVEMBER: October slides into November. A dead snag in the woodlot is felled and the sound of the axe rings out across the silent fields. An old rail pile is buzzed up for the kitchen stove and the woodshed is piled to the roof. The gutters are cleaned when the trees around the house shed their last leaves and the valves

THE WISE HUSBANDMAN looks to the welfare of his wagons and his plows as well as his cattle. Against the rigors of coming winter, the creaking wagon is greased, the planter oiled and painted, and the moldboard and share are polished and stored.

say, "and meat will keep." Long before sunup the fires are cracking under the kettles of water and the big barrel is tilted back of the scraping platform. The first fat hog is dragged in from the pen and plunged into the barrel of boiling water. White and steaming he is hung on the gambrels and the women are given the casings to clean for the sausage. The hams and bacon are carried into the smokehouse where they are given a brisk rubbing with the mixture of salt and sugar and spices that only grandfather knows how to mix. There will be fried tenderloin for supper and sausage and hot cakes for breakfast. The women folk will make headcheese and mincemeat and there'll be other delicacies of pork and corn meal and perhaps pickled pigs feet for the Sunday evening cold table.

There will be a skift of snow on a morning, and the men will take their guns from the racks and the dogs will race out across the fields in front, the first to reach the thicket where the quail and the rabbits hide.

There's a red ring around a Thursday on the calendar in the kitchen, Thanksgiving, the farmer's own date for the end of autumn and the beginning of winter. After that comes the heavy snows. Work is light. There are the chores for the men and the cooking and the churning and mending for the women.

Poets call the autumn the melancholy season, but to the farmer it is a fulfillment of the promise of the year, a reward for labor done.

THE POET may sing of the perfect days of June, but to the farmer the perfect day comes in Indian summer. His granaries are full, his animals fat and snug, and shelves of canned good things stand around the walls of his cellar. The promise of the year has been fulfilled, and nature takes a last bow in a perfect setting of sunshine and painted colors.

THIS CHICKEN HOUSE hasn't been cleaned in a hen's age. When litter piles up, both man and bird benefit. The man gets less work while the chickens glean minerals, and vitamins that prevent disease, cut feed costs and help make eggs hatch. The nine inches of litter in this house is composed of shavings, lime and droppings.

Lazy Man's Henhouse

It's poultrymen's tradition that a dirty hen house is a crime. Now scientists say litter saves labor and helps the birds prosper.

BELIEVE it or not, the more litter you have in your chicken house, the better your chickens will do. This is not a gag, but a recent discovery that for the poultryman ranks with the discovery of hybrid corn and weed killers for other farmers. Since the turn of the century, when the chicken business left the barnyard and went commercial, poultry raisers have had chronic backaches from cleaning out the laying pens and the brooder houses.

Sanitation and cleanliness have been drummed into them by every poultry magazine and broadcast by the experts in government bulletins. The 1948 Yearbook of Agriculture sums up the basic law of successful chicken raising as follows: "The floors should be thoroughly dry cleaned with a scuffle hoe and a stiff broom at least twice weekly until the birds are at least 10 or 12 weeks old. Fresh clean litter should be put in after each cleaning."

It is an axiom of the business that if young chicks eat their own droppings they catch something awful, like coccidiosis, and die like flies. To keep this rugged schedule of cleanliness has discouraged many a budding chicken man and sent him back to his work bench in the factory. Those that stuck to the business found that more than half their time was spent in making their establishments tidy and sanitary, and they dreamed of a world in which the chickens were either

more hardy or performed their own housework.

Then quite by accident it was discovered that the numberless man hours of scraping and spraying and shoveling might just as well have been spent fishing in the pasture pond. During the war, when labor shortages developed, many poultrymen were forced to put off their biweekly cleaning and bedding, and litter accumulated. Perhaps some lazy person with an aching back said, "To hell with it. I'll not clean this week." The chickens didn't mind in the least and went on growing and laying and slowly it dawned on the overworked poultrymen that perhaps the deepening litter might be a blessing in disguise. The researchers took up the idea and after a year or two were prepared, in their cautious way, to announce that deep litter not only is harmless, but has definite advantages of growth and health factors and a bearing on feed costs.

This sounds Utopian, and it is. It is especially good news for the commercial chicken man; the farmer with a small flock has never been too meticulous about his chicken house. It is cleaned once or twice a year and the litter carted out to the garden. Poultry experts said this might be all right for the small farm flock but would never do where chickens were grown in quantities. It now appears they were slightly in error.

Deep litter is not new, even among the professional growers. Charley Scott, a commercial raiser of Radnor, Ohio, says, "I've raised chickens on deep litter for more than a dozen years, partly because I didn't have the time to keep the houses clean. I've seen young chicks eat litter over and over again and if it is dry they get along OK."

Scott recalls a job he had with a large hatchery in Pennsylvania. "I spent about half of my time feeding the chickens and the other half cleaning out the houses. Every time I caught up on my work the boss would have me grab a brush and start cleaning. Now that we know deep litter is good for them, I can use that cleaning time for other tasks."

Why Deep Litter Works

Although poultry experts are convinced that deep litter is good for chickens, and have even made charts showing its advantages, they offer little more than shrewd guesses why this is so.

Chicken experts cautiously hazard guesses why deep litter cuts down cannibalism and coccidiosis, makes eggs hatch well, and helps keep chicks from turning their feet to the ceiling. Too, they are not all agreed that litter is a source of vitamins and proteins. Just now they will do little more than offer a collection of guesses. Here are some of the guesses.

They have noted that deep litter and coccidiosis are not often found in the same house. Some of them believe that the

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LITTER IS GOOD as long as it's dry. Lime helps keep it dry. A fresh layer of litter and frequent stirring also help. Only the manure in the pits beneath roosts is removed regularly. Dirty eggs are no problem unless the litter gets moist and sticky.

THIS IS THE SIXTH BROOD of chicks on the same litter. Coccidiosis and cannibalism disappeared when litter was not cleaned from this Ohio Experiment Station brooder house. The home-made brooder cost six dollars, is warmed with two heat lamps.

Farm Artist

"THE first painting of mine that anyone noticed," says Alberta Strauss, whose first published work appears here, "was when I put lacquer red all over the living room furniture. When Dad saw it, he took a three mile walk so he wouldn't murder me. That same year, I painted Christmas cards for the fifth grade kids at District School 13 on the Germantown-Carlisle Pike and sold them at a dime each. That was the last real cash I received for a painting until *Farm Quarterly* saw my work."

In introducing the work of this new and promising young artist, *Farm Quarterly* hopes to open the gate to workers in clay, wood or oils whose thinking stems from the farm and who have not yet had a hearing.

As a child, Alberta, whose paintings carry the improbable signature of A. Small Strauss, made designs with wax crayons on her mother's (best) tablecloths and ironed them in; and with lime, paris green and red barn paint permanently altered the appearance of the corn crib. "My family got the habit of not leaving me alone on the farm," she says.

After graduation from high school she enrolled in a liberal arts course at Miami University and her parents, although professing themselves not worried about her future, left the farm and went to Oxford, Ohio, to live with her while she attended school.

She has never studied painting. By one of those fruitful accidents of life, she was attending an exhibit of paintings by the Russian primitive artist, Israel Litvak. She commented happily on the way his horizons fail to met the sky, but instead are ingenuously separated from the sky by a golden flood of light. Her words were overheard by J. B. Neumann, internationally known art critic.

They became friends and for the past five years he tended her ideas about art and literature through personal teaching and through almost 500 letters. This year he offered her a one-man show at the New York Art Circle, a top-flight art gallery of which he is director. It is a recognition awarded an artist at the height of his career rather than as his first professional coup.

The painting on this page is the Ohio farm of her youth as she remembered it. The painting on the right was inspired by her young son, Roger. Behind him are the skyscrapers of the promised land; in front is a green snake which represents the evils he will conquer. He faces life, like his mother, with clear, frank eyes, the heritage of the farm.

TWO PAINTINGS BY A NEW FARM ARTIST—ALBERTA SMALL STRAUSS

Feeding Corn Cobs

A farm nuisance turns out to be good feed for fattening cattle

THE red-headed stepchild of the feed family—the corn cob—is beginning to catch the eye of the farmers who feed cattle. The results of tests using the revolutionary feeding ideas of Paul Gerlaugh, Wise Burroughs and L. E. Kunkle, scientists at the Wooster, Ohio, Experiment Station, have suggested that many farmers are wasting quantities of good feed. These feed lot results indicate that cobs are worth half their weight in shelled corn for fattening steers to choice market grades.

It may be some time before the corn cob is accepted into the best feed circles, and is included in the feed recommendations of other college bulletins. In the meantime farmers can use the results of the Ohio work with cobs to make worthwhile savings in their feed costs as well as to gain a sense of satisfaction in the knowledge that their farm operation is becoming more efficient.

Grinding ear corn, cobs and all, is not a new idea. However it has been a generally accepted thought that if we shell the corn and grind only the grain we have a more concentrated and better feed. Paul Gerlaugh points out that his acquaintance with corn and cob meal started when he was a small boy in Clark County, Ohio. "I used to ride on the wagonloads of corn we took to the mill near Medway," he says, "and the sweet-smelling bagged meal that we brought home was the best fattening feed we could get for our steers. Driving back from the mill had its advantages, too; for the soft bags were 'good sitting' compared to those sharp-edged, flinty ears that we took down.

THIS IS Paul Gerlaugh, who wasn't satisfied to see the corn cob discarded and burned throughout the Midwest. His feeding experiments at the Wooster, Ohio, Expermient Station, indicate that the ground corn and cob meal in the scoop in his right hand is as good feed for beef cattle as the ground shelled corn in the other scoop.

A CORN COB, from a hybrid field corn plant like this one, mothers on an average, 700 kernels. From the cob the grains get their nourishment and grow to shiny, hard, yellow maturity. Here the composition of a kernel is indicated diagramatically.

WHEN YOU grind whole ear corn in the hammermill, use a screen that keeps the size of the largest cob pieces down to pea size. Then the animals won't nose them aside to eat their dessert first.

"When I went to Agricultural School at Ohio State and later to the Pennsylvania State College," continued Gerlaugh, "I kept working on the feeding possibilities of corn and cob meal. In my field work down in Lancaster County, Pennsylvania, I saw Dutch and Amish farmers use it as a base for their feeding. Of course they kept cattle not so much for the beef they could sell as for the manure that the steers would make. Lancaster County beef always graded high in the Eastern markets. Their feeding schedule was three parts corn and cob meal, one part bran, a bundle of stover and all the hay a steer could eat.

"Here at the Experiment Station in Wooster, we have had a chance to check the feeding value of corn and cob meal under controlled conditions alongside shelled corn, and we've found out some surprising things."

The Packers Liked Their Looks

"Fifteen years ago we started tests at the Madison County Experiment Farm to compare the feeding value of shelled corn with corn and cob meal. There had been tests before, the results were a 50-50 proposition. Some said cobs were good feed; others said they were just bulk. All of these past tests had been with older steers. We wanted to see how corn and cob meal worked for calves and yearlings, which is what the market uses today. We wanted to feed a liberal amount of protein to encourage the digestive bacteria in the cow's first stomach. At the time of the older tests soybean oil meal hadn't come on the market.

"The corn that we used all came from the same crib and was ground in a burr mill. This was typical farm handling of the feed and the animals, with nothing fancy in the way of equipment or hay. For three years calves were used for the tests, then yearling steers were used for two years. The tests all told the same story; the corn and cob meal produced slightly faster gains. After nine or ten months the calves and steers were fat enough to be bought as 'choice plus' beef by the packers."

Says Gerlaugh, "These first results brought us to the question that really started our cob tests. We asked ourselves, 'If the cobs are playing a constructive part in the feeding, what would happen if we added extra cobs?' If you grind up whole dry corn you can figure that the ratio will be close to 56 pounds of corn grains to 14 pounds of cobs. We wanted to know how much cobs could be added to that 14 pounds, and still make good our fattening program.

"In 1942 we started out to get the answers to these questions using various corn and cob mixtures. The calves we used were Herefords, which we fed for 252 days. Two pounds of soybean oil meal (44% protein content) to which minerals had been added, was fed to each animal a day. Our mixture of minerals consisted of two pounds of steamed bone meal, two pounds of limestone and one pound of salt. This mixture was added to 100 pounds of soybean oil meal. Our hay was ordinary farm hay, mixed clover and timothy. The calves were given as much of it as they would eat, and they averaged 4.3 pounds a day. The corn was a year old; it was ground medium fine in a hammermill so that the cob particles could not be nosed aside in the feed bunk by the animals."

Waving his hands in the air and making chopping motions to describe how the calves were divided up, Gerlaugh progressed with his story. "We made no particular selection of the calves, just put them in groups of 20 each. They averaged 485 pounds when they went in the feed lot at the start of the test. We also fed some of the calves individually, but they did not do nearly as well. We figure that it was because they didn't have the hot breath of other calves behind their ears at the feed bunk to make them eat more; competition is a wonderful thing with animals or humans.

"We prepared our feed this way: first, a ton of ear corn was shelled and the weights of the corn and the cobs recorded. The shelled corn was then ground. Then for our second batch of feed, a ton of the ear corn was run through the hammermill, without shelling. When we were ready to prepare our third ton we added to it the cobs we had left over from the shelling of the first ton. So this third load had double the normal amount of cobs which would be in the straight corn cob meal mixture. It was ground like the other two tons. That year our shelling percentage of the corn averaged 81.5% shelled corn and 18.5% cobs.

"Each calf got 2 pounds of the soybean oil meal—mineral mixture and 4.3 pounds of the mixed hay a day. The corn mixture varied, as you'll see below."

Finally They Were Fed

"The first group of 20 calves were fed from the first ton of ground shelled corn, all they would clean up, which averaged 11.3 pounds a day. This group was on our 'control' feed mixture. It's about the average amount of grain fed to feeders in the corn-belt. The second group was fed from the second ton, which was the straight corn and cob meal. They could eat a little more of this, and averaged 12.4 pounds a day. The third group ate from the third mixture, with the same gusto, 12.4 pounds a day of the corn and added cob meal ration."

Jumping over the tedious months of weighing, feeding, keeping records and constant care that go with fattening any cattle, Gerlaugh stopped short on the point of the gains which the cattle had made. "Our records," he said, "show that to put a hundred pounds of gain on the calves we fed these amounts of the three rations. With group one (you remember they were fed ground shelled corn) it took 573 pounds; group two (on the straight corn and cob meal mixture) required 623 pounds of the ration, which was made up of 508 pounds of corn and 115 pounds of cobs. That saving of 65 pounds of shelled corn, by using 115 pounds of cobs, figures out as a 56.5% replacement value for the cobs in terms of shelled corn. To put one hundred pounds of gain on the group three calves (they were fed corn and added cob meal) took 646 pounds of the ration, which was made up of 444 pounds of ground shelled corn and 202 pounds of cobs. The saving here was 129 pounds of shelled corn (573 less 444). At $5.00 a hundred for shelled corn, that's $6.45 saved in putting on 100 pounds of gain. And it's a replacement value for the cobs of 64% in terms of shelled corn.

"Even with a slightly lower dressing percentage for the group three cattle, as you'll see later on, we think we're conservative in our statement that cobs are worth 50% of their weight in shelled corn for producing fat cattle of choice grades."

The Buyer Calls The Pay-Off

Over the 252 days of feeding the average daily gains of the groups were: group one, 1.97 pounds; group two, 1.99; group three, 1.93. Here is a slight slippage in performance for the group three cattle, but the money that was saved in the feeding them eliminates any further explanation.

The shrewd cattle feeder—and you have to be that to make money on feeder cattle—will not let these results go unchallenged. "That's all very well," he'll say, "but the pay-off with cattle is how the buyer grades them and what he'll pay for them. And after he buys them and slaughters them he'll check up on the dressing percentage. What's that going to be on these cattle that are fed a lot of bulk in place of corn?"

Here are the answers: Swift and Company bought all three lots of these cattle and they were graded as follows:

	GROUP 1 Fed shelled corn, 18 steers slaughtered	GROUP 2 Fed regular corn and cob meal 20 slaughtered	GROUP 3 Fed corn and added cob meal 19 slaughtered
Carcass Grade			
Choice +	9	5	11
Choice	7	13	6
Good	2	2	2
Dressing Percentage	61.05	59.93	59.36

As the Experiment Station scientists studied these results it looked just too good for the cattle that were fed the extra corn and cob meal ration. Says Gerlaugh, "We were in the same position when we analized our results as the average cattleman is when he sees these figures for the first time. We thought the best

THIS HAPPENS hundreds of times a day in the Cornbelt. Cobs are burned to get rid of them. They could be processed into useful feed or litter for farm animals.

SAM MARTING, JR. dishes up a meal of ground ear corn with added cobs for his father's Bea-Mar Hereford breeding herd near Washington Court House, Ohio. The Martings say corn cobs have made good feed for their fine cattle.

thing we could do was to keep still and run the tests over again. This we did the following year. This time we used exactly the same rations, only we started with yearling steers which weighed on an average 700 pounds. The results were practically the same. The steers were fed for 196 days and at the end of that time the ground shelled corn fed group had averaged a daily gain of 1.94 pounds a day; they dressed out at 61.9%. The regular corn and cob meal fed lot gained 1.91 pounds a day and dressed out at 61.6%. The added cob meal lot gained 1.87 pounds a day and dressed out at 60.7%. Again, all three groups graded practically the same when they were sold."

Several times since these early tests both calves and yearlings have been fed out with parallel results.

Larger amounts of soybean oil meal have been used in feed lot tests in 1948. The result was faster gain, but at a higher feed cost per pound of gain. Smaller amounts of soybean meal were also used —down to none at all. This slows down the gain past the point of diminishing return. If a farmer has the amount of money invested in feeders that it requires today and is operating on high-priced farm land he wants to put the gain on as fast and as economically as possible.

Paul Gerlaugh points out several interesting facts about their feeding experiences. "There was practically no difference in the hay consumption of the cattle, whether they were fed ground shelled corn or corn and added cob meal. The presence of four pounds of cobs didn't change the hay consumption a quarter of a pound.

"The cob feeding values decreased as the feeding period advanced.

"The cobs which were added seemed to have as much feed value as the cobs which were in the ground ear corn mixture.

"Corn a year old was used in most of the tests. However, new corn will work just as well if you don't grind so much that it gets mouldy. The corn was ground sufficiently fine that cob particles were no larger than a kernel of corn. Seldom were any cob particles left in the mangers."

How It Works On The Farm

Sam Marting, the owner of Bea-Mar Farms near Washington Court House, Ohio, is known in Hereford circles as one of the country's top-notch producers of fine purebred breeding stock. Marting was one of the first men to find out about Paul Gerlaugh's work and it didn't take him long to adapt the corn cob to his own feeding program. He describes how he makes his grain mixture.

He says, "I fill our corn wagon half full of ear corn. That's up to the first board. Then we load the wagon to the top with corn cobs we have left over from shelling corn for our pigs. That figures about 3500 pounds of whole corn and 1400 pounds of cobs, counting the 20% of cobs in the ear corn. This mixture we grind fine in our hammermill. Then we fill up our feed mixer nearly to the top; it holds a ton. To this we add 100 pounds of soybean oil meal, and about 60 pounds of salt and minerals. For carrying cattle, two years and older, we feed this mixture six to eight pounds a day along with plenty of hay. However, we don't feed cobs to our calves. Up to four months old we feed ground shelled corn since calves' rumens have not developed fully. For calves from four months to two years of age we grind ear corn and add 300 pounds of soybean meal and minerals to a ton of it. I would say we are saving about 30% on our feed bill by using cobs, and our animals have never looked better."

Around Lafayette, Indiana, a group of farmers feeding western calves heard about the value of cobs in 1945. One of these men, Ray Anderson of Darlington, tells how he fed ground ear corn.

He says, "In October 1945, we bought 153 head of western range Herefords. They averaged 389 pounds. We wintered those calves in a corn stock field. They got 3½ bushels of ground ear corn apiece from October to May. Each calf ate ½ ton of mixed hay. When they went on good legume pasture May 1st they averaged 520 pounds apiece. They spent the summer on this good pasture, but were given no feed.

"We started our fattening August 1st when they weighed 800 pounds. We fed them ground ear corn. Each calf got 12½ bushels of corn in the period from August 1st to October 24th. They also had about ½ pound of concentrate a day, but they were still getting good protein out of the pasture. They sold, averaging 946 pounds, for 25c a pound on October 25, 1946, grading 'good.' I figure that the ground whole corn makes good feed or we wouldn't have been able to put on that 146 pounds in 85 days. About the only beef man who can afford to use shelled corn, and disregard the feed saving of using the cobs, is the man who wants to ring the bell at the International; feed costs don't matter to him."

Roswell Garst of the Garst & Thomas Hybrid Seed Corn Company in Coon Rapids, Iowa, tried feeding cobs (a real surplus item in the seed corn business) in 1946. He says:

"I believe we have a unique story about feeding corn cobs. We process more hybrid seed corn at one point than anyone—we

(Continued on page 140)

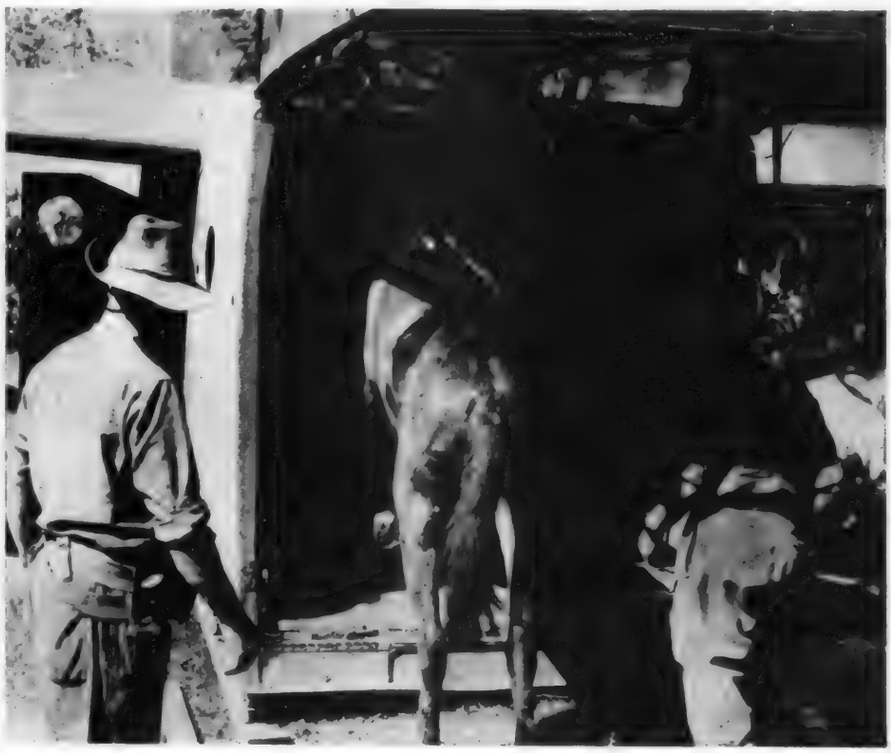
THE FLYING MULES

how the real "Flip Corkin" dreamed up the idea

of hauling men and mules far into Jap territory

with planes and gliders . . .

BY PHILIP G. COCHRAN



THE SOUTH END of a British mule as he is being loaded into a U. S. glider for the trip north into Burma. The Aussies with turned-up hats and bush knives, and their mules, made up the invasion force that landed back of the Jap lines in the jungle mountains.

LET me tell you a mule story, how 1,699 mules flew over the trees to help beat the Japs in Burma.

In 1944 my outfit got the word that we were to be assigned to the China-Burma-India Theater. This was the last place we wanted to go. However, this change of duty solved a very personal problem. Milton Caniff, the artist of the comic strip "Terry and the Pirates," had dreamed up a character named Flip Corkin, who was supposed to be me. People believed that I lived the exciting and fanciful life of Flip Corkin; often I was asked questions about China and I had never been there.

While this character was swash-buckling his romantic way around China and Burma I was getting shot at by the Heinies in Africa and living in a hole in the ground. Now that my outfit was going to Burma, Flip Corkin's home territory, I wouldn't have to masquerade any longer.

When we landed in Burma I was assigned the job of organizing an air task force that was to support the troops of the British jungle fighter, General Orde Wingate. We were bound that since we had to do this thing, we were going to get some fighting in it one way or another, so we stretched General Hap Arnold's carte blanche orders to "build a force that will support Wingate in any use of airplanes that you can dream up." We ended up with P-51 fighters, B-25 medium bombers, C-47 transports, two hundred L-5's and

L-1's, two hundred and fifty CG-4A gliders, a squadron of light transports (C-64's) and four helicopters.

Wingate's plan was to penetrate Japheld Burma through the mountainous jungle that rims the flat central part of the country. His force, 17,000 odd men and 1,700 mules, using the matted jungle as protection, would get into the very middle of the Jap area, there to cut communications and cause as many kinds of damage as possible to the enemy facing General Stillwell in the North.

Wingate's plan was to send in columns from three directions, one from India on the west, one from China on the east, and one through the American sector held by General Stillwell on the north.

These troops had to carry their equipment and arms with them, mortars, field pieces, radios and all the paraphernalia of the jungle army. Trucks or wagons could not get ten yards into that country so it was to go on men's backs and on the willing backs of army mules. The defense of these raiders, marauding in enemy territory, depended on being constantly on the move, strike and go. And the movement depended on mules, silent mules; they were de-brayed so they couldn't betray their position to the enemy. (We called the operation a brayectomy.)

Our original part of the operation was to fly out Wingate's wounded. However, in going over his plans with him, I was appalled at the thought of his men sweating and hacking their way all those hundreds of miles through the jungle. It was an anachronism in logistics. The obvious idea of "planting" those brigades by air started to dominate our thinking and before I knew it I had committed our task force to carrying the jungle army with gliders and airplanes. We would land the gliders in jungle clearings, then build landing strips for cargo aircraft. Wingate's enthusiasm for the plan led me out on the limb.

How could we fly 1,700 mules into the jungle? "They're skittish enough on the ground," was the opinion of our pilots. That was the starting gun in the worst mental rat-race I've ever gone through. Every man in the outfit who had ever had a speaking acquaintance with a mule was given a grilling: "How do you make a mule lie down? How do you tie him? Can you give a mule ether, or a shot to put him to sleep?" We talked mules, read about them, dreamed about them, and the days went by. Our apprehension in trying to fly the mules all stemmed from not having any "containing" method for them. You can imagine what three or four beasts could do if they went berserk in the air. The pilot in a glider was "in the open," so to speak. He was not enclosed in any way. He sat right in the cargo compartment and if the mules were to go nuts and start stampeding around that glider, the boy would have to jump.

Then a private came in with this idea, "My uncle is a horse doctor. He has a big board that has straps mounted on it, and it is held up in a vertical position with a block and tackle. When he has a sick horse he walks him up alongside the board and straps him to it at his legs, neck and around his withers. Then the board is lowered to a flat position and you can operate on him or do what you want with him. Why couldn't we fix the mules up this way?"

A lot of these boards looked like the answer to our mule-carting problem. We could strap the mules to boards and then slide the boards into the gliders. One sergeant even got so enthusiastic about the idea he figured we could stack the mule boards three high in a glider like a triple decker sandwich.

The mule boards were a good idea, but the work of modifying the gliders looked prohibitive. "But we'll do it if we have to," we said.

A hint from a test run with a horse in New Guinea led me to dreaming up another idea, a strap device that put the mule's belly in the center of a jury-rigging arrangement that strung him to the roof and the floor of the glider. You can guess the material and manufacturing problems involved in that one.

The British solution (they knew the mules) was to build box-stalls that weighed more than the four-legged passengers and were a sizable installation problem themselves.

Boy, we were in a considerable flap!

Then, one day one of the glider sergeants came up with a thought that even he had doubts about. "But we might learn something," he said in hedging on his idea. He suggested that we put a couple of mules in a glider and take them into the air "to see what they do." He said, "If they kick the glider apart or go nuts, the pilot can jump." We'd thought

GENERAL ORDE WINGATE, the British jungle fighter, and Col. Phil Cochran, U. S. Air Force, dug out all of their books on mules. The problem was to find a way to keep the mules from kicking the planes and men to pieces—in the air.

THIS MULE said "No." Neither oats nor hay could convince this private that an airplane was the quickest way to travel. Loading one mule was bad enough. Getting 1699 more, into planes and gliders, was an army-sized headache, and backache.

of reasons against everything else so we decided we might as well take the chance on this one. To eliminate some of the danger, I insisted that safety measures be added to the plan and that the British had to agree to the whole thing.

The plan was to put three of our mule friends in a CG-4A glider and give them a test hop. Experienced skinners were to go along to soothe their charges or shoot them if their actions called for such safety measures.

We got in touch with the British and had them bring over three mules with three skinners to handle them. We raised the nose of a glider (that's how they load), and the three nervous skinners marched the three nonchalant mules aboard. A few minutes later the C-47 took off with the mule-glider in tow. They circled the field while we and the British alike watched through glasses to see which side of the glider the mules would kick out first.

Nothing happened.

Then the glider was cut loose and it came down to a perfect three-point landing. The tension was broken when a mechanic yelled sarcastically, "One of the mules must be flyin' that crate."

The nose door opened and the three skinners marched their charges out. One mule started to eat grass; one mule stretched out his neck and gave us a silent "hee haw"; and the third, exhilarated by the flight no doubt, took a couple of practice kicks at his two-legged companions. The third kick caught a skinner in the seat of his shorts, and it was a clean field goal for mule's team.

Our flight test of these three mules was enough for General Wingate. We went in on the night of March 5 and at dawn the bulldozers and tractors got busy on the runway. At dusk that night (we did all our flying at night so that the Japs couldn't shoot our planes down: Japs rarely flew at night) the airplanes and gliders loaded with troops, mules, ammunition and guns started landing. It took us about seven days to get in the first ten thousand men and 1,000 mules. Our total air haul was 17,000 British soldiers and the 1,699 mules into the heart of Jap territory in Burma, 190 miles back of the Jap lines. Out of the original 1,700 mules, only one ever gave enough trouble to be shot. A British sergeant shot him the minute his shenanigans started.

Wingate's Raiders made history in the following months, and they had their mules with them. The suddenness of the planting of these well equipped troops right in the middle of their area really confused the Japs. I think it was almost a full two weeks before they would believe what we had done. The whole campaign was extremely effective because it cut all the Jap lines of supply from south Burma (Rangoon) to the divisions that were engaged with Stillwell in north Burma. They were finally forced to live off the land; we know that for a three-month period they got practically nothing, since Wingate was able to block the railroads, the roads, the rivers. Stillwell was then able to demolish the north Burma Jap army.

Our own boys used this whole affair as a gag line from that time on. Whenever anyone proposed a complicated method of doing a simple job, someone was sure to sound off with, "First ask the Mule."

Agronomists say most American farms need more lime but they don't always agree on how it works, how much or what kind.

LIME

TO the farmer of fifty years ago the word "lime" meant whitewash, which reluctant small boys daubed on fences. Today if you say "lime" to a farmer he begins to think in terms of tons per acre, for he has been told that it improves not only his fences, but his crops and animals, and not least of all, his children and his bank account. He would be a backward farmer indeed if he didn't use lime as a soil treatment, providing, of course, his soil needs lime.

This journey of lime from farm fences to the soil all happened in the space of a short lifetime. Three fourths of the cultivated land of the most productive part of America needs lime, and probably has always needed it. There may be isolated patches of virgin soil which have adequate lime to grow all crops, but they are about as rare as democrats in Maine.

The practice of liming was known before the Christian era. In this country in colonial times a few smart farmers used lime, but it was not until the first part of the twentieth century that the practice became general. During the last fifty years, what with heavy cropping and accelerated leaching, the need has become acute. Twenty-five years ago there was only a piddling of lime used on soils; a mere three million tons in the whole country. In 1944 we used twenty-five million tons and will soon use forty million, which is almost what we need to maintain a constant and adequate supply of our cultivated land and pastures.

Some experts say that Ohio, for instance, needs 30,000,000 tons of lime to bring soils to the desired sweetness, and would need 2,000,000 a year to maintain the level. One southern state uses only 3% of what it should use. Other guessers say, with some scientific information to back them up, that every acre of farm land loses two hundred pounds of lime a year by leaching. Add to this the amounts taken off by crops and subtract that put back in form of manure and crop residues and you have a fair idea of the amount of lime needed each year. This averages a ton to every acre every ten years. Some soils need more; some crops need more; a ton to the acre every six to ten years is a minimum requirement.

Soil chemists and agronomists thumped their tubs for a good many years before farmers began to believe in lime for bigger crops. Some are not completely sold even now and regard lime as a hard necessity, like a dose of castor oil; it's very unpleasant to lay out the money for lime, but the doctor prescribed it. Many farmers take a dim view of liming. They make token applications only, and are careless. If you drop a nickel in a juke box, you get paid off with a tune in a few seconds. The farmer who drops three dollars in the slot for a ton of lime for each of his acres must wait years for the full benefit of his outlay, and even then he may fail to see definite results.

Why Soils Need Lime

Soil scientists do not all agree on the functions and benefits of lime in agriculture. The experiments of Dr. Wm. A. Albrecht, of the University of Missouri, may lead to an entirely new conception of the functions of lime. Until these experiments are completed and announced the commonly accepted theories must serve as a basis for explanation. Dr. Albrecht says, "Unfortunately, in science one does not give birth to a new truth merely by assembling a majority vote on some common practice."

Lime has two main functions on the farm. (1) It corrects the acid and alkaline needs of the soil. (2) It supplies plant food and brings about many secondary effects which affect the growth of plants such as the immobilization of toxic substances and the increase in availability of plant nutrients. Lime goes into plant tissues and from there into the body tissues of man and his livestock. Bones are mostly calcium. The amount of calcium taken each year out of a pasture field is only a little less than the weight of the bones of the cattle, hogs and sheep fattened on it.

The reason you can't raise maximum

THE pH TEST is comparatively simple, but a complete soil test requires close study of directions which come with the kits. Lime needs are based on the complete tests, not alone on the acid condition of the soil. The type of soil is also a factor.

crops without lime is tied up with chemistry. If you can take a little punishment we'll have a brief lesson in science. Soils are either acid or alkaline. In the right amounts both are useful, for both are conditions necessary to render nutrients available to the plants. If the soil is too acid or too alkaline there's hell to pay in the little world surrounding the roots of a plant.

The principal acids in soils are not the common drug store acids like sulphuric and nitric. Such acids are soluble and would wash easily out of the soils, resulting in decreased acidity, whereas soil acidity increases with the prolonged movement of rain water. This is because the main soil acids are the particles of clay themselves. Clays do not wash out of soils, but the calcium, magnesium, and potassium, all important plant foods, which were fastened to the surfaces of the clay particles do wash off, leaving the acidic clay behind in increasing proportions. There are other acids too, acids resulting from the decay of vegetable matter. But it is the clay acids that give us trouble. The most acid soil is not as acid as lemon juice, but even this is so strong that the hydrogen impares the exchange capacity of the soil, and there are so little nutrients left that plants cannot grow. They, as well as soil bacteria, starve for nutrients.

Azotobacter and Clostridium bacteria, which gather nitrogen from the air and accumulate it in the soil, have been found to become inactive or die out when the soil is very acid.

It has been found that when soil is above pH 7.0 soluble phosphates which plants must have tend to become insoluble. It is plain then that the margins of acidity for fertile soils are rather nar-

row, and this is why so much stress is placed on the accurate measurement of soil acidity. When soils get to an acid point of pH 5.0 or below, aluminum and iron compounds are formed which are injurious to some plants.

The haphazard use of lime, for correcting acidity alone, is being questioned by soil scientists. They say it is important to know your plants and the pH they require. They believe that the acidity angle is being stressed too much and that calcium and magnesium as plant foods and as agents to release other minerals, are being largely overlooked. They say that only at pH values of 5.5 and below do we need lime for correcting acidity. Lack of calcium and magnesium, especially in sandy soils, is often mistaken for acidity.

Also we must beware of believing that lime is a panacea for all ills of the soil. When used with good fertilizer management and the proper rotation we get the best results. The best lime program starts with the legumes. If you lime for these, your other crops will likely fall in line.

Amount of Lime Per Acre

The amount of lime to be used may range from a few hundred pounds to several tons per acre of agricultural lime, depending primarily on the degree of acidity and the type of lime used. The crops to be grown is another important consideration, as is the buffer quality of the soil. A heavy soil requires more lime. Under general farming conditions in the Midwest a pH of 6.5, which is very nearly neutral, is the best for all crops. However, some legumes will do better on sweeter soil. Your soil tests will indicate the amount of lime necessary to bring the pH from its present figure to the desired point. The accompanying chart shows approximately, in tons per acre, how much lime is needed at any desired level on the average Midwestern soil. Sandy soils take less; heavy clays, two or three times as much.

TONS OF LIME PER ACRE TO BRING pH TO 6.5

	4.0	4.5	5.0	5.5	6.0	6.5
Sandy & Silt Loam	6.0	5.0	4.0	2.0	0.5	0
Clay	8.0	7.0	5.0	3.0	1.0	0
Muck	12.0	10.0	8.0	6.0	3.0	0

The pH liked best by the common crops:

Crop	Corn	Wheat	Alfalfa	Red Clover	Oats	Potatoes	Soybeans
pH best for max. crop	6.0 to 6.7	6 to 7	6.5-7	6.8	6	5.3	6.5 to 7.0

The amount of lime needed to bring your soil to the desired pH, and the amount to hold it there, are separate considerations. Your soil tests may show you need three tons of lime to bring your soil to the right pH. Thereafter you will need approximately one ton per acre every six to ten years to hold it there. This is an average for the Midwest and Northern states. In the South, where rainfall is heavier and leaching greater, it will take more unless the soil is sandy.

The availability of lime, immediate and over a period of months or years, is a direct factor in the amount of lime to apply. If you use superfine dolomite or hydrated lime you may need only a few hundred pounds per acre to achieve the required pH. On the same field you may need as much as two or three tons of coarse ground lime. The neutralizing power or the acid corrective strength of lime varies directly with the fineness of grind and the carbonate or oxide content. A general rule is that with the higher grades less is used but must be applied oftener. The farmer decides upon immediate availability and more work, or long-time availability and less work. The cost of the finer grades, over a period of years, is slightly higher than the coarser grades. There is danger of over-liming when using the finer grades and the final results are probably no better.

Too Much Is Too Much

It is possible to apply too much lime. A strongly alkaline soil ties up phosphates and possibly other plant foods. Since all crops do best at their own level of acidity, any wide variation will throw the soil out of balance and lower yields will result. Even the legumes, which like a comparatively sweet soil, show a diminishing return when the sweetness goes beyond pH 7.5 to 8. It would be a mistake to neutralize soil for potatoes, and under certain conditions for corn. The best management on sandy soils is to determine by test the pH of your field and apply the indicated amount of lime for the crop you are planting. The pH test is not a reliable index for lime needs on sandy soils; on such soils actual calcium and magnesium determinations should be made. The pH measures intensity only, not capacity. It is doubtful, if fertilizer is used intelligently, that any crop does its best in a distinctly alkaline soil. Sweet clover and alfalfa have been grown successfully in a 5.5 to 6.0 pH soil when adequate rock phosphate was used.

A soil that is too sweet apparently encourages plant diseases. This is especially true of potatoes. Too much alkalinity is probably more harmful to growth than too much acidity.

This pH Business

The symbol pH is used by soil chemists to indicate the acidity of the soil. You may skip this paragraph, but if you want to impress your friends by being the first farmer in your community to know the technical meaning of pH, you may go to work on the following:

Water is composed of two atoms of hydrogen and one of oxygen. The symbol chemists use is H_2O. Due to slight electrical charges, a small part of water divides itself into two different parts, (1) a hydrogen, and (2) a hydrogen and oxygen, or OH part. These parts chemists call ions because they carry electrical charges. The hydrogen ions are positive electrically, and the OH ions are negative electrically. The hydrogen ions are acid, and the OH ions are negative electrically, and alkaline. The electrical charges carried by these ions can be measured, and the numbers of ions determined. These numbers proved to be so large, even in one cubic centimeter of water, that it was impractical to write them out, so a shortened method of recording them was adopted by dividing the logarithms of these big numbers into one. This reduced these large numbers to single digits. It was found that when the numbers of H ions and OH ions were equal that the number was 7.0 and the solution was neutral, neither acid or alkaline. When the H ions were in excess and the solution was acid, the numbers came out less than 7.0. Numbers above 7.0 mean that OH ions are in excess. The scale is called the pH scale, that is, the numbers of *positive Hydrogen ions.*

If this explanation is not as simple as we expected it to be, all you have to remember is that on the pH acidity-alkalinity scale, 7.0 is neutral. Numbers less than 7.0 are acid, and numbers larger than 7.0 are alkaline. The term "neutral" does not mean that the soil is neither acid nor alkaline, but that the two conditions are exactly in balance.

Now that we can talk learnedly about pH, let's apply our learning to the south forty. The south forty has been in the regular rotation for a number of years and has raised fair crops of corn, oats and hay. However, we are told that we may perhaps grow eighty bushels of corn, like our neighbor does, instead of the fifty we grow now if we first get the soil in condition by a crop of clover or alfalfa. But the county agent insists alfalfa won't do any good in these parts unless the soil gets a dose of lime.

How are we to determine how much lime the south forty needs for a crop of alfalfa, remembering that lime is not a panacea for all ills, but does its work only when accompanied by proper amounts of fertilizer, good soil aeration and tilth, and the proper crop rotations?

Tests for pH

The "visual" test for acidity is simple. If you have a field on which laurel, poverty grass or broomsedge, or briars are growing happily, you may suspect it of being acid. These plants like an acid soil.

The simplest of all chemical tests is the litmus paper test. A small package can be purchased at any drug store. Take a handful of moist soil from three or four inches below the surface and work in into a ball. Break the ball in two and place a piece of blue litmus paper on one half and press the two together, allowing it to remain for about five minutes. Then open the ball. If the paper has turned a mild pinkish color, the soil is slightly acid; if it is

FARMERS HAVE LEARNED that if their soil will grow a good crop of legume hay the other crops in the rotation will prosper. They apply lime to get the proper pH for clover and alfalfa; corn, oats and wheat will use fertility provided by the legumes.

reddish, there is more acid; if it is very red, the soil is decidedly sour. If the paper remains blue, the soil does not need lime.

The litmus paper test is sometimes advised on the theory that any old test is better than no test at all. To obtain a more accurate test, take soil samples from your field and send them to your state extension department for analysis — and then wait. Take the samples from a few inches below the surface and take them from numerous places in the field—one from each acre or from spots where topography or soil composition might indicate varying degrees of acidity. Also send along a few taken with a soil auger from about a foot below the surface on different parts of the field. The best way to take a sample is to dig a hole, plow depth, smooth one side of the hole, and take a thin slice with the spade. Then, with the slice still on the spade, take your pocket knife carve out a thin portion as the sample.

Each sample should consist of about a pint of air-dried soil from which all foreign material has been removed. Draw a map of the field and label each sample with its proper location identification. A soil-reaction map can then be made and lime applied accordingly. Circular 346, Illinois Experiment Station, gives detailed instruction for preparing such a map.

While the help you can get in collecting samples and running tests varies from state to state, you may call on your Extension Department, the Soil Conservation Service, your county agent, or even your fertilizer dealer, to help you.

If you want to eliminate the chore of preparing and shipping samples, and the delay which most state universities seem unable to eliminate, you can make your own tests. The simplest and easiest way to go about this is to buy a soil-testing kit. There are a number of excellent kits on the market. The accuracy of tests made with a kit depends on the carefulness of the operator, his eyesight and color sense, and the quality of the kit. Good kits are made by Sudbury Laboratory in South Sudbury, Massachusetts, and LaMotte Chemical Products Co., Towson, Maryland. Purdue University, Lafayette, Indiana, has designed a simple kit which is well liked. These are selected as examples because they are relatively simple and accurate. In these kits you have an assortment of chemicals with directions, and color charts with which you match the colors with those from tested soil. Solutions are made from soil samples, a reactor is added, and the color you get is matched with a color on the color chart. This indicates the pH.

If you have a scientific turn of mind and can remember some of your high school chemistry, you can buy your own chemicals and have some fun. If your labor problem is normal, you'll not have the time for this interesting chore. A home assembled testing kit can be accurate to a high degree in the hands of a farmer who is also part chemist.

The Comber Test

There is still another test, especially good when used on soils high in organic matter having large amounts of organic acids concealed in them. This test is based on the fact that if the soil is acid, the acid acts on iron to produce a red color. The redder the color the greater the acidity.

The re-agent used is ½% solution of Potassium Sulfocyanate, (KSCN), obtainable at any drugstore, in denatured alcohol. A small amount, say 1 ml., of oven-dried soil is placed in the bottom of a vial or test tube and covered with twice its volume of the Sulfocyanate solution and shaken. Let stand for some time; if the soil needs lime a pink color will develop. The brighter the color the more lime needed. No color indicates no lime.

An additional method, which is the most accurate of all tests, is to use an electrical pH meter. This gives results which are absolutely accurate if the meter and the electrodes are properly adjusted and the soil sample properly prepared. The apparatus is expensive, costing from $170.00 up, and requires some study for

(Continued on page 120)

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WINTERING HOGS

(Continued from page 65)

of other hog maladies thrive on filth. Hogs are naturally clean animals. They prefer to live under clean conditions and if they have a choice will eat from clean feeders rather than dirty ones and sleep in clean bedding rather than filthy litter. One Midwestern farmer proved this to his own satisfaction by conducting a little experiment with the four weanling pigs that he planned to raise for the family table. He divided the back one-third of the hog house from the remainder with a two by six. With a shorter two by six he divided that area in half. In one half he placed fresh bedding and left the other half clean. The pigs slept in the clean bedding and visited the other half of the boxed off area for their chores. They even kept the area in the front of the house around the trough free of manure.

When you bring your pigs up for fattening, check your books and if the pigs haven't been vaccinated have the job done, for cholera can come at any season. It is always best, however, to vaccinate while pigs are still nursing or when they are five to seven weeks old.

Give The Man Credit

The boar is more than just the man around the hog house. His first purpose in life is to repopulate the earth with young healthy pigs and many of them. His satisfactory service depends upon his care and management during the winter months. He needs attention as surely as the sows in his harem.

The boar, like his pregnant wives, needs exercise. If he is housed outside, his shelter and feed should be at least 100 yards apart to force him to get off his hams and walk.

He should not be allowed to put on excessive fat for it cuts down his efficiency. He is best able to do his job when generally thrifty, but not fat. Throughout the year, he should be fed adequate protein and minerals to maintain his strength and virility. He needs more than the straight corn ration on which many boars are kept. Corn is a good feed for any hog, but it is not complete when used alone, and boars should not get all the corn they will eat. In winter feed him ground alfalfa hay and make up the bulk of his diet with ground oats, ground barley, shorts, oil meal and milk. If he grows thin and hungry looking, increase the corn and oil meal in his diet and when he begins to grow fat and lazy, cut down these feeds and increase the alfalfa to give him more bulk and less fattening foods.

Prepare For The Coming

Toward the last of winter the sows grow heavy with pigs they are carrying and the owner starts preparing for the farrowing season. Farrowing season in the spring is the last big hurdle in wintering hogs.

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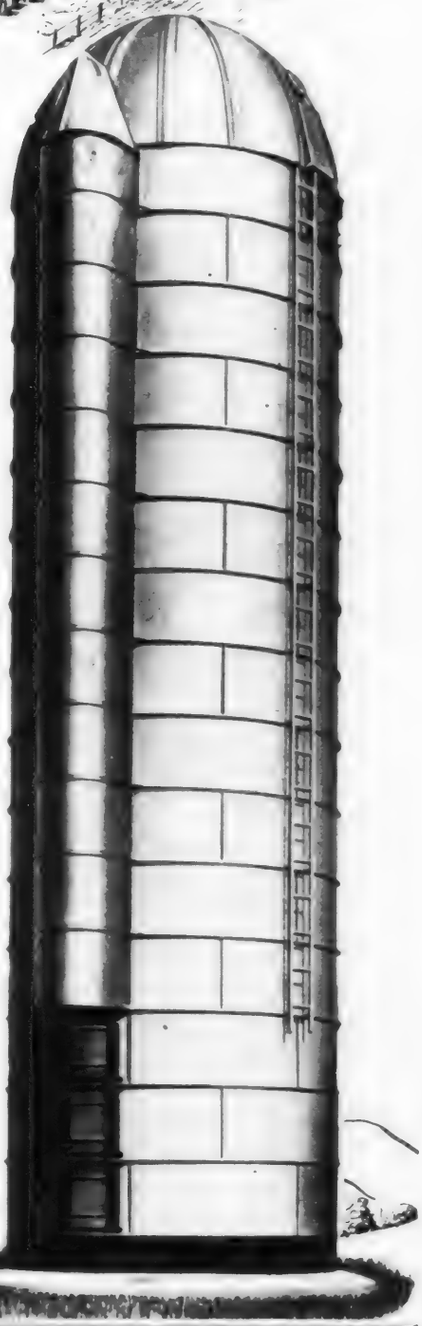

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Considerable thought, work, and planning precedes farrowing time on most hog farms, for on the success of the farrowing season depends much of the year's income.

When a sow's time approaches, get her into the farrowing house. The warm, well ventilated house in which she was wintered will serve well during the maternity period providing the sow can have her privacy. Colony houses should be divided to give each sow a separate compartment. Additional fixtures that the owner may want to add are a pig brooder and protective railings around the edges of the house to protect the pigs from being laid on by their mother. A hover across one corner will keep the pigs warm and dry. They will be attracted to the heat and thus kept out of the sow's way except when hungry or curious. The hover should be about 12 inches from the floor. Railings on the walls of the houses help protect the pigs if the reclining sow happens to catch her off-spring between her body and the wall. A railing can be made of pipe that extends six inches from the wall all the way around at a height of eight to twelve inches from the floor. A two by four can serve the purpose.

Before farrowing, the sows' houses should be thoroughly washed and disinfected. If she is moved into a new house the change should occur four or five days before her pigs are due to give her time to settle before farrowing starts.

Ten days before farrowing, start to replace the corn in the sow's diet with more bulky feeds. Three or four days before the farrowing time the sow's rations should be reduced to just enough to keep her from growing irritable from hunger. This cuts down the dangers of milk fever and scours.

When the sow comes in milk, grows restless, and begins to pile her bed up she will likely drop her litter within 12 hours. The good attendant who is an old hand with hogs knows that his job is to leave the sow alone unless she needs help.

Julian Logue, a Union County, Indiana farmer, who raises two to three hundred market pigs each year believes, "The sows can do a better job of having pigs than I can. I look at them before I go to bed," he adds, "but it's best to leave them alone. Make sure the bedding is dry and that there isn't too much of it and, if it's cold. bank the houses with straw or fodder to hold the body heat. If you go out every hour and lift the top of a farrowing house to inspect the sow, the house gets cooled off. Some fellows sit up with their sows all night, but I don't. I figure there isn't much I could do for them that they can't do for themselves." Logue's sows averaged better than eight pigs per litter last spring. Most farmers, however, like to be close by when their sows are in labor.

If the sow is nervous and continuously gets up and down, however, her pigs should be removed as they are born and placed in a basket or tub with an electric light bulb and covered with a burlap bag to hold the heat. Young pigs face their most critical period right after birth when they can chill rapidly. Sows are individualists and each one should be handled according to her individual needs. Some sows will require more attenion than others and the attendant must offer his help in accordance with the needs.

With the completion of spring farrowing most of the difficulties of wintering hogs have been hurdled. Spring brings with it promises of plentiful pastures and fewer feeding difficulties. Nature can help hogs maintain their needs during the summer months when the earth is green. It is during the winter that the hog farmer keeps his animals productive by knowing what they require and seeing that they get it.

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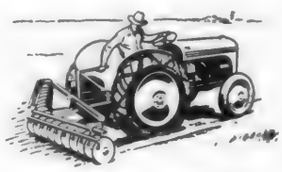

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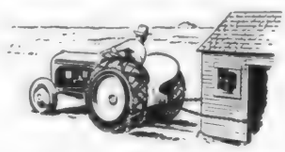

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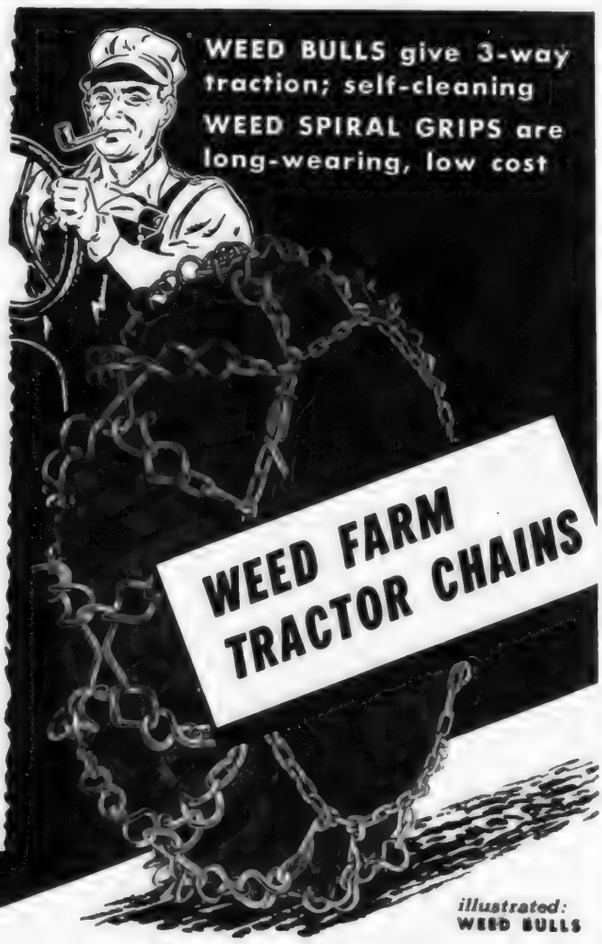

illustrated: WEED BULLS

WEATHER

(Continued from page 31)

by days, the average rainfall and the temperatures for many years back for every county in America.

The Local Picture

Another booklet which every farmer should find useful is the "Sectional Climatic Summaries of the United States." These summaries are prepared for specific climate sections throughout the country and may be obtained for your area by sending 10 cents to the Weather Bureau, U. S. Dept. of Commerce, Washington, D. C. They give local recordings of rainfall, temperature, frost, and other data in your community for many years back, and will serve as a guide for the future.

Verne Kaufman of Terre Haute, Indiana, is a farmer who runs his place with a weather-eye cocked toward the northwest and his plans based on every local weather statistic he can get his hands on. He says, "After we bought this place, I got in touch with the Weather Bureau and found out how much rain I could expect. There's no sense pushing your corn planting and fertilizing up to 12 and 15 thousand stalks an acre unless you've got good rainfall. The Extension Service at Purdue says you need about 20 inches of rain, between May and September, in order to make it worth while to plant seed for 12 thousand stalks of corn. According to the record, our average here is just a shade over 22 inches in these 5 months; so we're going to try for a big yield this year with a 12,000 stalk planting and plenty of fertilizer. The Soil Conservation Service used our yearly rainfall figures, about 42 inches, in laying out the terracing we did in one of our fields. We also use the Weather Bureau's frost tables in planning our crop planting times."

Weather Becomes a Big Business

Around the country are a number of individuals who have made weather forecasting into a paying business. One of these men is Dr. Irving P. Krick of Pasadena, California, former Caltech professor and President of the newly formed American Institute of Aerological Research. He has turned the science of meteorology into a service that supplies money-making predictions for all kinds of clients. Krick serves farmers, ranchers, airlines, ball-club managers, vegetable growers and a variety of clients. Krick uses techniques which he helped develop during World War II as head of the long range forecasting and research activities of the U. S. Army Air Force. His weather estimates have been astonishingly accurate a month, and even a season, ahead of time. His service enables ice cream manufacturers to take care of the heavy demand that comes with a hot spell, and electric companies to prepare for peak

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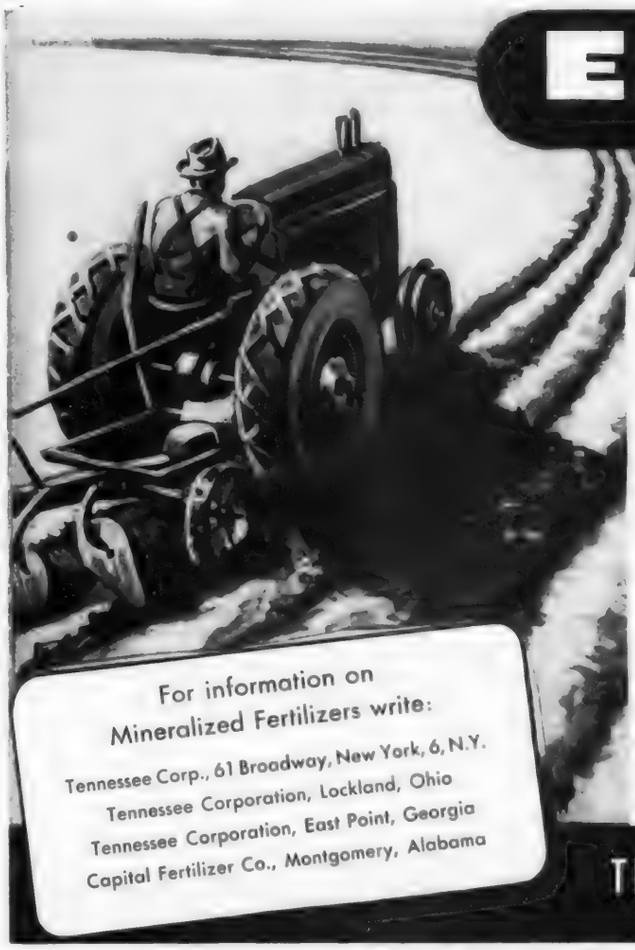

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loads that come with cloudy weather. Walt Pretzer, a Cleveland grower of hot house and outdoor vegetables, uses Krick's service to decide what he is going to plant as well as to set the actual planting date to miss the last frost of the spring. He ships a large percentage of his tomato crop into Pittsburgh and the east. He says, "We can't afford to spend months on careful ground fitting and care on our fancy tomatoes then put them in a truck and let them freeze on the trip over the mountains. We plan our shipments according to the best local and eastern forecasts.

Weathermen are finding new uses for their services every day. One baking company in New York City maintains a meteorologist to predict tomorrow's baking needs. A windy or rainy day will keep a million housewives indoors, and 50,000 loaves of unsold bread can be a major loss. This weather prophet has often predicted down to a few hundred loaves, what a great city will buy!

Weathermen Lead a Hard Life

When the weatherman predicts the weather right no one ever calls him up and says, "Boy, you sure hit that one on the nose." If he is wrong a few times in a week, especially in the baseball season, he becomes the butt of jokes in every sports writers column, for there is no game to write about.

Weather science is, at times, very difficult to work with. A forecast is prepared and given to the papers. By the time the farmer reads it as he pulls the paper out of his mail box, it may be ten hours old. In the meantime, the weather has double-crossed the weather man and he's wrong again. Human nature being what it is, we remember his wrong forecasts for a long time, especially if our hay gets wet.

Weather maps are much more pictures of yesterday's weather than they are predictions of what will happen in the skies tomorrow. So many of the "fronts" and "masses" featured on the maps will dissipate or change in character so that only the extreme or pronounced weather patterns can be counted upon to remain in tomorrow's picture.

Weathermen speak of weather in terms of lows, highs and occluded fronts. Bad weather which a farmer would call a "tobacco-stripping" day is a personality to a meteorologist. Watching the progress of a low on his map the weatherman begins to speak of it affectionately. One farmer calling a Weather Bureau office for information about hay cutting was startled to be told that he could go ahead with the 20-acre field because, "Kitty isn't due for two days." Then the weatherman hastily added that they had nick-named a low that was moving slowly toward them, "Kansas City Kitty."

The type of information a weatherman is called upon to give varies with the part of the country. One weatherman from the city took over in a farming district when the regular meteorologist was sick. He was besieged with requests from farmers who

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Some farmers waste lime where it's not needed —others don't use half enough. With your Sudbury Soil Test Kit you know just what is right. Some fields may need twice as much phosphate as others. 10-minute tests right on your own farm tell the exact proportions of nitrogen, phosphate and potash to apply, so the fertilizer you buy this winter or next spring will give you bumper crops in every field next summer.

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Test your soil and you can get back up to $3.00 or more from every dollar you spend for fertilizer. Trials on seven fields in Illinois proved that every $14.42 spent on potash and phosphate paid off $43.00 in extra crop yield. In Maine, testing and fertilizing pastures increased milk production of a herd from 33,000 lbs. to 43,400 lbs. This brought $370.00 additional milk receipts per year, at a cost of $74.00 for fertilizer —$296.00 extra profit just by following soil tests! In Tennessee, cost of producing wheat dropped from 69c a bushel without fertilizer to 32c a bushel with fertilizer.

Save Time, Effort, Money

Soil tests save much time, effort, and money often wasted using wrong kinds and amounts of fertilizers. An Illinois farmer saved $500.00 by using 125 tons of limestone instead of the 360 he *guessed* his soil needed. This saved enough to buy all the phosphate tests showed he needed on 65 acres.

—Photo Courtesy Wisconsin Agricultural Experiment Station

As this picture shows, even after liming and using phosphate where soil tests showed they were needed, also adding potash raised corn yields greatly. Balanced fertilizer guided by soil tests can produce 100 bushels per acre, even up to 150!

Raise Healthier Stock

A famous Virginia stable found after producing generations of champion race horses for many years, it was fast losing ground in spite of careful breeding. Fewer and fewer winners were being produced and frequently foals were deformed or stillborn. Soil-conscious, the farms manager had tests made which showed the bluegrass lacked phosphorus. Superphosphate was applied, and even the next season the tide changed. Now the stable is back in the running again.

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Need a part-time hired hand for those hundred-and-one "before winter" jobs? With the CHOREMASTER Garden Tractor and low-cost attachments, you can take care of fall clean-up chores quickly and easily. The CHOREMASTER sweeps lawns, cuts grass and weeds right up to fences, trees, etc., hauls light loads, plows snow and can be equipped with power sprayer or small wood cutting saw for brush and saplings.

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YOUR DEALER will gladly demonstrate a CHOREMASTER and the many attachments that make it like many extra "hands" around your farm. Write for free bulletin describing uses and attachments. Buy now at this low price—and insure delivery for fall, winter and next spring tasks.

Buy Now at this Low Price

$146.50 with Standard Clutch

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Attachments extra

Special Products Division

The LODGE & SHIPLEY Co.

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were waiting for a customary cold spell before slaughtering their hogs. "Is the weather going to be cold enough to kill our hogs?" they asked, "Gosh," remarked the new weatherman, "I never knew pigs were so delicate that cold weather could kill them."

Since 1946, when Dr. Irving Langmuir, associate director of General Electric's research laboratories, announced cautiously that "certain types of clouds, under very special conditions, could occasionally be made to drop their moisture" there have been innumerable stories in magazines and newspapers about man-made rainstorms and snowstorms. When these stories of dry ice seeding are carefully checked back to their source we invariably find one of two facts: first, the amount of rain or snow amounts to .03 to .12 of an inch. That's roughly the amount of a good heavy dew, and won't help crops very much. Second, some of the highly publicized rainfalls, like the one in Oregon, which took place after $15.00 worth of dry ice was dropped over Troutdale, was part of a state-wide rainfall. Seeding one small area at a time when rain was moving in on the state doesn't provide very conclusive proof of man's ability to produce rain at will.

At the insistance of farmers and other people who want to get an accurate picture about rain-making the Weather Bureau has set up a fact-finding project with the U. S. Air Force at the All Weather Flying Center at Wilmington, Ohio. This summer, with modern airplanes and an extensive radar and rain-gauge check-up system, the Air Force and Weather Bureau has attempted, (1) to make it rain when a cloud is not quite ready to rain. This would put rain on an area which might be missed if a thunderstorm were left to its own designs. And (2), to find out if it is possible to arrest the development of violent thunderstorms, thus preventing lightning, hail and violent downpours, which cause great damage to property and crops in the Midwest. The Air Force and Weather Bureau have used every method that has any rain-making possibilities: seeding with dry ice, spraying with large drops of water, and even dumping quantities of chopped ice into clouds which are potential rain clouds. The results of their work, when they are published, should give some factual answers to one of man's oldest questions, "Can we make it rain?"

The secret electronic protective device of the last war, radar, has been put to a peacetime use in making accurate predictions and measurements of how much rainfall will come down out of the sky. Up to now, our rainfall measurements have been taken at Weather Bureau stations and by a number of civilian cooperators. Radar rainfall measurements are far more accurate than these scattered rain-gauge readings and they will no doubt be used extensively in the future. Already radar is being put to use by the Illinois State

4 CYCLE AIR COOLED

THE CLINTON ENGINE

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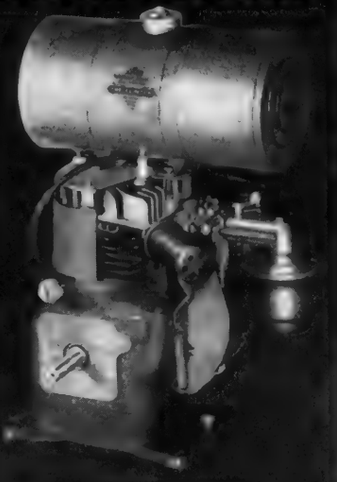

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CLINTON MACHINE CO.
CLINTON, MICHIGAN

Water Survey. They are using a war surplus radar, of the type which was used in a B-29 bomber, and will map the rainfall in several areas of the state.

For farmers, these radar developments give promise of a future when we will know by calling a Weather Bureau office what amount of rainfall we can expect and whether the storm-path will pass over our farm. If the farmer is a flyer he will be able to find the exact locations of storms and be given a course to avoid them. Radar is now being used to plot every storm within a 200-mile circle; in the future the Weather Bureau may work with a chain of radar stations to further increase the accuracy of their work.

Since we found out about rain-making only a few years ago, no one knows what scientific research will develop for rain-making in the future. Some day we may be able to produce our own rains. Such knowledge will be a mixed blessing, however, for as Dr. Francis Reichelderfer, Chief of the U. S. Weather Bureau, says "What a headache it will be for the Weather Bureau to decide whether to keep it sunny for the ball game or make it rain for the farmers."

The Ground-hog's Shadow

Chief animal forecaster in American folk-lore is the ground-hog. He is supposed to be a great sleeper and have a nose for the weather. Apparently, there is something about sleeping, and sitting, that gives one some extra perception, weather-wise. For when Grandpa's corns hurt we knew we were in for a bad spell of weather, and Grandpa sat a lot. But the ground-hog wasn't like Grandpa. He didn't trust an indoor prediction. He would come up from his hole and his long sleep on February 2 and take a look around. If he saw his shadow and went back to bed, it was a sure sign of six more weeks of winter. For people who had a hard time finding a ground-hog and observing him, a cat would do. A cat that sneezed on that day gave the same prediction, and if a cat came into the house and curled up with its back toward the fire, it was sure to bring on cold weather. When a cat scratched a table leg, a change in weather was to be expected.

The skies, the moon, the planets were all studied for their weather secrets. He who seeks, finds; and people found many omens, some fantastic, some fairly accurate. The Greek poet, Aratus urged people to read the weather in the changes of the moon, or "Cynthia's face." So trustworthy was the moon believed to be in forecasting weather that she became a guide in animal and crop raising. The castrating of pigs, the planting of potatoes, the felling of lumber trees won't be touched by many an old-timer, even today, without first consulting the almanac for signs of the moon.

The almanac was a good source of other weather information too. There were the day-by-day "conjectures" on the weather. By studying weather reports for a number of years, a fairly good guess could be set up for the future by the printer putting the almanac together. There is the story of the New Hampshire printer ready to go to press with "The Old Farmer's Almanac". He was asked by one of the shop boys what was to be placed under July 13.

In careless haste, he answered, "Anything, anything."

The boy, literally obedient, set the type up—"Rain, hail and snow."

The diligent readers were surprised, but when it came to that day, the prediction was fulfilled, it really did snow, hail and rain on that July 13. That was in 1816. This served to add to the reputation of this almanac, which is now in its 156th year.

Weather Changes People

Scientists have discovered that weather influences your behavior. They say that if you live in the "storm path" of the United States you are apt to be more energetic, capable and resourceful. Roughly, this storm path area cuts a swath across the country several hundred miles wide from the Pacific Northwest to the Atlantic Coast, and takes in our industrial and cul-

(Continued on page 138)

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PRESSURE QUEEN

Does jobs that are impossible with other spray painting outfits of similar size

THE PRESSURE QUEEN is the *only* portable spray painting outfit on the market that has four cylinders in the space usually required for a single cylinder. They are precision ground and honed to mirror-finish. Crankshaft is drop forged steel, precision ground and balanced like the crankshaft in your automobile. Valves are of stainless steel and bearings of solid bronze. All moving parts are bathed in oil by positive forced feed lubricating system. Fans on fly wheel keep cylinder block and air chamber from overheating.

With Pressure Queen you can paint the highest parts of your home, barns or silos. It spreads the protective paint as evenly as the finish on your automobile—does as much work in an hour as a painter can do in half a day with brushes—pays for itself in time saved on a single good-sized job.

Pressure Queen inflates tires on cars, trucks, tractors. Lubricates chassis, touches up and refinishes fenders and bodies, farm machinery, porch and lawn furniture—paints interior walls—sprays insecticides and disinfectants on livestock and pens—does scores of odd jobs in the work shop and on the farm.

Every Pressure Queen Spray Painting outfit is factory tested before shipment. Comes to you completely equipped with 15 ft. spray hose and spray gun. With ⅓ h. p. motor the price is $99.95. With ½ h. p. motor the price is $109.95. With Gas Engine the price is $122.50. Extra lengths of spray hose, pressure tanks, grease guns, etc., are available.

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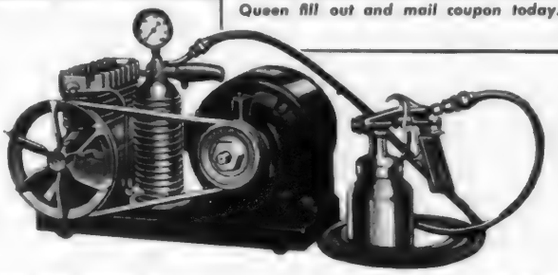
If your dealer cannot supply Pressure Queen fill out and mail coupon today.



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SCOTTDEL FEED MIXERS

Live stock profits are too important to lose because of poor slipshod mixing methods. Scottdel Mixers are available in four models and three sizes. 25 bushels (1000 lbs.) 45 bushels (1800 lbs.) 80 bushels (2500 lbs.) Write for catalog.

SCOTTDEL, Inc.
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NO. 21—FOR NECK. Adjustable chain. Numbered both sides. $11.50 per doz.
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NO. 25M—Marker Plates without chain. Key Ring Fasteners. $6.50 per doz.
NO. 38—DOUBLE PLATE NECK CHAIN. Upper portion strap; lower portion chain. $12.50 per dozen.

NO. 25 — DOUBLE PLATE ALL CHAIN MARKER. Marker Plates Brass Plated, numbered both sides. Chain is brass plated. Weight, 1 lb. each.

Price: $14.50 per doz.

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WRITE FOR FOLDER

WONDERWELD PRODUCTS
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BARN CLEANERS

(Continued from page 44)

tion eliminates the separate elevator outside the barn. An electric motor-driven drum winds up the chain and pulls the litter out to the discharge point. A cable is attached to the back end of the drag chain and this in turn is connected to a return drum operated by a motor. After the litter has been pulled out of the gutter the chain is returned to position by starting the reverse direction drum. If the barn has two gutters, two cleaners will be required to do the job. This type of installation can be made with the fewest changes in existing concrete barn floors.

The DeLuxe Job

The endless chain type of cleaner makes an efficient and concealed cleaner for a barn where a new concrete floor is being laid. This type of cleaner is suitable for large barns where the two gutters are parallel or for "L" shaped barns. The gutters must be connected with cross gutters at each end to provide the travel space for the chain. The endless chain type cleaner has one heavy chain which rides on gears spaced at the corners of the center platform. Attached to the chain are a series of metal or hardwood paddles. As they travel along the gutter they collect the litter and discharge it at any point along the route. This may be a hole in the floor or an opening at the end of the barn, from which point it can be raised with an elevator, and dumped into a spreader. The drive mechanism is usually placed overhead at one end of the barn.

Barn cleaners are driven with a ¾ or 1 h.p. motor which is connected to a shaft through a gearing arrangement. The gears serve to transfer the power and slow down the speed of the motion. The shaft, in turn, transfers the power to the barn cleaner chain, which is most efficient when it moves at a speed of 12 to 20 feet a minute.

Since every barn has different dimensions most barn cleaner manufacturers prefer to make the installation through a regular dealer on a "ready-to-go" contract. The prices will vary according to the size of the barn and the type of installation.

Barn cleaners are trouble-free once they are installed properly and adjusted. The chain can break of course, but the replacement can be made by any farmer. In time the scraper paddles will wear out, due to the corrosive action of the urine. Manufacturers have not been making barn cleaners long enough to know the whole story, but they believe the paddles will last from five to eight years. The people who recommend the wooden paddles say they will stand up better than metal, but that's a question that time will answer. In the summer when the cows are in pasture most farmers remove the chains and give them a coat of rust-inhibiting oil before storing them for the season.

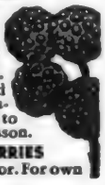
Barn cleaners were developed in Wisconsin, one of the great dairying regions of the country. All five of the manufacturers who distribute and service their cleaners on a national basis are located here too. They are: Anderson-Tomfohrde, Wisconsin Rapids; Eagle Manufacturing Company, Appleton; Eau Claire Equipment Company, Eau Claire; James Manufacturing Company, Fort Atkinson; Marathon Foundry & Machine Company, Wausau.

READY TO BEAR
PLANTS and TREES

Thornless BOYSENBERRY
Same as common Boysenberry except has no thorns. Vines grow 25 feet long. Hardy. Bear 10 days earlier. Prolific.

New STREAMLINER Everbearing STRAWBERRY
Newest and best everbearing known today. Bears 60 to 90 days after set, and outbears all others. Flavor better than Wayzata.

GIANT MORRISON BLACKCAP RASPBERRY
Not just another Blackcap, but a much larger one—many nearly an inch in diameter. Firm fruit and disease free. This late variety should be planted to lengthen the fruiting season.



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WHITE ROCK LEADERSHIP!
PROVEN BY OFFICIAL TESTS

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Helps Livestock to Do Well

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NUTRITIONAL RESEARCH ASSOCIATES, Inc.
Dept. A2, South Whitley, Indiana

BARLEY

(Continued from page 57)

and roots to penetrate easily and to allow for good drainage and areation. The seed should be nicely packed in fine, moist soil. The preparation of the seedbed will depend largly on the type of crop that has been in the ground before.

Where barley follows beets, corn, tobacco or other inter-tilled crops a light discing and harrowing to break up any clods and to level the surface is about all that is needed. If barley follows one of the small grains or pasture it will, of course, be necessary to plow before discing and leveling. In the northern plains spring plowing and prompt seeding is the common procedure but further east and south where the small grain crops come off early the land will usually be plowed in the fall giving an opportunity for catching and storing up a supply of moisture.

Thick-set, sandy haired, Alden Kolb, of Cleveland, Wisconsin, who raises certified seed barley as a profitable sideline to his dairy herd, is a little more particular about preparing the seedbed than most. He says, "Our fields are always fall plowed and in the spring we go over the land with a spring tooth harrow. After planting I usually follow with a cultipacker." He smiled, remembering last year, and added, "Of course, when we get a wet year and have to sneak the seed into the ground, we don't cultipack." Kolb has proved his ability to raise barley by carrying away a first prize at the International in 1930 and winning the 1946 Grand Champion Prize in Wisconsin. The last contest brought him a handsome bronze plaque and a $500 cash prize. "That was the most I ever got for a bushel of barley," he said.

Planting

Up north, in the spring barley region planting will be done as soon as the farmer can get on his soil. Some farmers plant their wheat and oats first since barley is considered to be a little more susceptible to frost injury. There is an old saying that every day you delay after you can get on your land will cost you a bushel an acre. Herb Gettel says, "We have planted our barley as early as March 12, which is *very* early here in the north, and we have had to wait, like last year, until May 17 but we paid for it in the size of our crop. We seed at the rate of about two bushels to the acre and our seed is treated with Ceresan to help prevent stripe and smut." Farmers in warmer regions get by with as little as a bushel to the acre with the average being about a bushel and a half. Like Gettel good farmers generally follow the recommended practice of treating their seed. Many have the equipment to do this at home but commercially treated seed can be secured.

Barley is drilled close to the surface where there is a good concentration of moisture. Fertilizer is put on the land at seeding time. Fertilizer needs will differ

THE 1947
CORN KING
USED
Indiana
Certified
Hybrids
Walter J. Harpel's ten ear sample of Yellow Dent (Ind 844D Seed Parent) awarded first prize at International Hay & Grain Show at Chicago.
1st AWARD

WALTER J. HARPEL, Grand Champion, and other International Champions win with Indiana Certified Seed

Once again, the International Corn King is an Indiana farmer. And, once again, the prize winning corn was grown from Indiana Certified Hybrid seed. In addition to the new Corn King, Walter J. Harpel, of Crawfordsville, Ind., other International champions who won with Indiana Certified Hybrids were: Reserve Champion, Arthur L. Colbert, of Washington, Ind. (Indiana 813 B Seed Parent); Champion Hybrid Shelled Corn, John Rutherford, of Henry County, Ind. (Indiana 608 C Seed Parent); and Junior Reserve Champion, Jack Lux, of Shelbyville, Ind. (Indiana 813 B Seed Parent)—and many regional winners.

Indiana Certified Hybrids Win Again

In the 1947 Indiana five acre contest—oldest and most extensive such contest in the entire country—sponsored by the Indiana Corn Growers' Association in cooperation with Purdue University, Indiana Certified Hybrids hung up a smashing record of wins. 55 out of 80 county winners, including 12 of the top 14, used Indiana Certified Hybrids.

John W. McCarty won the 1947 Indiana contest with an official yield of 173.4 bushels per acre by using Indiana Certified Hybrids. This honor was won in competition with 2,546 adult corn growers. In this contest Indiana Certified Hybrids won 30 of the 40 yields above 125 bushels.

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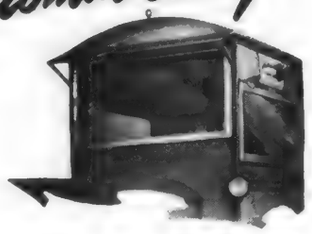

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A free booklet describing these points in detail will be sent upon request. Choice feeder calves, yearlings and two-year old Herefords or Angus for sale direct from range to feed-lot.

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Established in 1915

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Address correspondence to J. C. Holbert, Box 492, Washington, Iowa

from one locality to the next and even between fields. in any given locality. The usual fertilizer used on barley is high in phosphate and low in nitrogen with potash added according to the needs of the particular soil. Most growers prefer a very low nitrogen fertilizer since nitrogen stimulates stem growth which results in lodging. One of the faults farmers find with barley is a weak straw that is somewhat prone to shatter and lodge so they minimize this by cutting down on nitrogen at the time of planting.

If spring barley is to be followed with hay or pasture the seeding of the hay crop is done at the same time as the barley which acts as a nurse crop.

Harvesting

When the fields are straw-yellow and the heads nod heavily the farmer is anxious to get the binder or the combine rolling, threshing out the grain and winnowing out the pay crop. Then comes the delicate question, when to harvest? Delicate for a farmer who wants to get the most for his crop but, at the same time, is watching the sky for signs of rain. Grain buyers warn against harvesting too soon if combining direct, as the moisture content will be too high and the grain will develop heat damage in storage which means a cut in the price. On the other hand the farmer knows that if he leaves it too long there will be shattering and he will lose some of his crop.

Direct combining of barley is therefore a less general practice than harvesting with a binder or cutting with a swather for combining later. No matter which method is used the grain should be ripe before cutting. Herb Gettel, describing his method, says, "You keep watching your crop for color and about the time you get awful itchy to start harvesting you pull off a head and rub it between your hands. If it is ripe the grains should come out of the head easily. If it feels cold and damp it is not ripe and you have to wait a while longer. When it slips through your hands easily and when the grains are hard clear through when you bite them it is ripe. If you're doubtful about the moisture content for threshing and storing it is safest to take a sample to the elevator for a test. For storing safely, barley should test around 14 per cent moisture content."

Alden Kolb says, "At a distance a field of barley may look yellow and ripe but when you get into it you should look for a green tinge on the stems and heads. If this greenness is there it isn't ripe yet. The ripe barley will have a rich yellow color and will have a distinct ripe smell. The smell is hard to describe but if you have raised much barley you will get to know it. If you let your barley get overripe, particularly if it gets rained on, you will get to know the musty smell that it gets then."

The three methods of harvesting which are in use today are: harvesting with a binder, straight combining, and cutting

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HEREFORD HOGS
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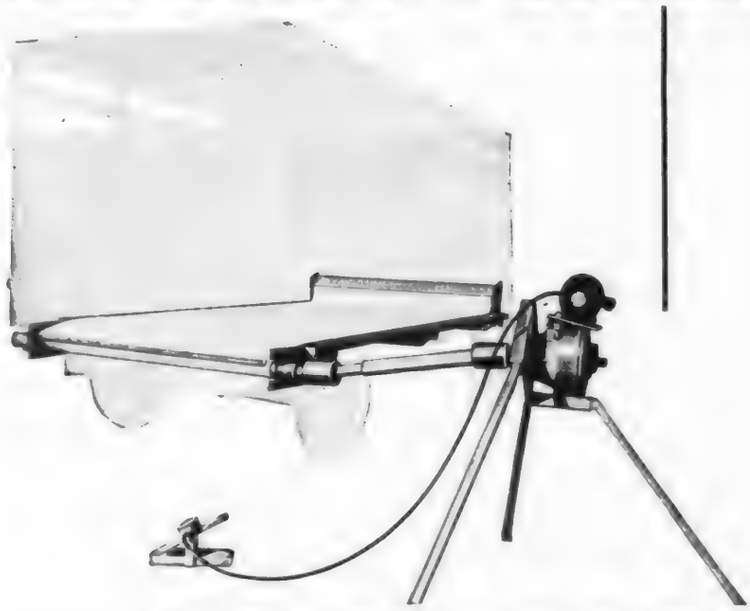

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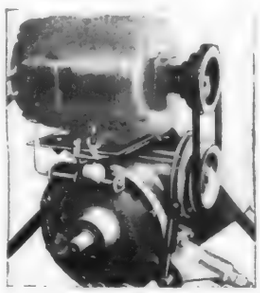

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WARNING!

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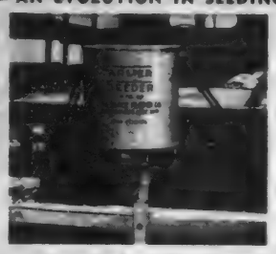
SOWS ANY SEED OR GRAIN THAT CAN BE BROADCAST

PUSH BUTTON BROADCAST SEEDING — AN EVOLUTION IN SEEDING!



WITH YOUR TRUCK YOU CAN CARRY YOUR SEEDS AND SOW FIELDS REGARDLESS OF DISTANCE

BOLT THE SEEDER TO THE TRAILER HITCH, AND HOOK MOTOR WIRE TO TAIL LIGHT

ACTUAL TESTS SHOW THAT THE ALL-ELECTRIC FARMER BROADCAST SEEDER . . .

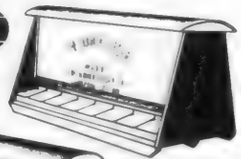
SOWS UP TO 15 ACRES PER HOUR • IS EASY TO MOUNT AND OPERATE • BROADCASTS GRASS SEED 30 FT., GRAIN 25 FT. • FITS YOUR CAR TRUCK, JEEP OR TRACTOR • IS POWERED FROM YOUR OWN BATTERY • SOWS ANY SEED OR GRAIN THAT CAN BE BROADCAST • DOES NOT THROW SEED OR GRAIN ON YOUR VEHICLE, THEREFORE CAN BE MOUNTED ON FRONT OR REAR OF YOUR VEHICLE AT ANY DESIRED HEIGHT • IS OPERATED FROM DRIVER'S SEAT • ABOVE ALL, THE FARMER BROADCAST SEEDER IS FAST AND ECONOMICAL.

Remember, the Farmer Broadcast Seeder is NOT operated from power take-off, but comes complete with an individual electric motor.

You may order the seeder with or without an individual electric AGITATOR. Agitator is optional at extra cost.

SLASH YOUR FEEDING COSTS

with Wood, Steel Clad Farmer Feeders. These units are well engineered: kiln dried siding, heavy galvanized steel trough lids, suspended mechanical agitators, reinforcements and oval roof construction. We have a feeder for any of your needs. Feeders are covered with two coats of orange enamel for years of weather protection. Get a feeder that gives you long life, is low in price and designed, tested, proved by successful hog raisers. Write for Free booklet today!



No. 8 FARMER FEEDER

No. 2 FARMER FEEDER

WHY BUY TWO WHEN ONE WILL DO?

Vacuum type hog fountains for year 'round use. Here you have a summer and winter fountain all in one. Easy to move, easy to clean, easy to fill, no crowding—a quality product that assures you of long life performance. Write today for complete Free Illustrated details.

VT 85 FARMER FOUNT

FARMER FEEDER CO. Inc.

CAMBRIDGE CITY • INDIANA

Quality Farm Equipment • Production Wood Crating

that means greater profits • apple, onion, potatoe crates, etc.

and combining later. Harvesting with a binder, followed by careful shocking and early threshing, should produce the best quality of grain but is not the most economical method. Straight combining is done but there is always the danger of having too great a moisture content for safe storage. Probably the most extensively used method today is to cut the crop and leave it in windrows to cure and later threshing it with a combine with a pick-up attachment. Herb Gettel uses the windrow and combine method. Like other successful barley growers he is very particular about the adjustment of the combine. He says, "Some farmers may make only one adjustment on their threshing machines for the whole harvest and then wonder why they get docked for cracked and skinned berries. You have to remember that in the morning the straw will be a little damp and a lot tougher than it will be at noon and if you work late you may start getting dampness again late in the day. You have to adjust your machine to take care of these changes or you will damage your crop. The best way is to keep watching the grain and if it is not in perfect shape you know you have to do something about it."

In those states of the north central region, where rainfall is usually sufficient through the growing season, the 1936 to 1945 average yield ranged from 30 bushels for Wisconsin down to 24.6 bushels for Iowa. In good years 60 and 65 bushels an acre are not uncommon on the better farms in this area. California had an average yield of 27.2 for this same pediod. The yield for Tennessee, which grows a lot of winter barley, averaged 19.2 bushels.

Marketing

The bulk of all barley grown as a cash crop finds its way from the country elevators to the floor of the grain exchange. The largest of these markets are in Minneapolis, Duluth, Milwaukee, and Chicago. Here barley is bought and sold strictly on the basis of samples taken from the shipment. The samples are taken and tested by government licensed grain inspectors who deliver the sample to the floor of the exchange before the commission agent, who sells the barley, or the buyers begin their haggling. Attached to the sample bag is a card giving the official grade, the moisture content, the percentage of undersized kernels, the amount of dockage, and the test weight per bushel. Along with the sample will go an envelope containing a handful of the barley that has been pearled to remove the hulls so that any heat damage or discoloration can be seen. The buyers spread out the sample looking for uniformity of size, plumpness of grain; they look at the color for the greenish white tinge of under-ripe barley and smell it for the ripe odor; they bite it and cut it to find if it has the desired mealy texture and is not flinty; they check the sample for cracked or frayed grains. In one corner of the room telegraphic tickers relay the prices on other exchanges and reports on crop conditions. Before the exchange opens and after it closes they talk grain. "Manitoba had a four-inch snow." "That's not bad for this time of the year. Snow is the poor man's manure." "Sioux City reports that three-fourths of the crop is in and conditions are perfect for a bumper." During the time the exchange is operating they set the price the farmer will get for his grain that day.

Diseases

Barley is subject to a number of diseases. Two of the most destructive of these are Fusarium blight or scab, the other is spot blotch, also called Helminthosporium blight. The organisms responsible for these diseases can live in the soil on remains of infected plants, and also may be introduced with the seed. They can attack not only barley but also wheat, corn and many of the grasses, and so are usually present in force in soils where these crops are grown over a period of years.

A plant may be attacked in most any stage from the time it first emerges as a sprout, through the seedling stage and up to maturity. The earliest infection, called seedling blight, may destroy the plant as it emerges. Coming on later in a milder stage it is called root-rot. This causes the destruction of a part of the root system which results in stunting the plant and premature ripening.

"the EASIEST way to give effective PENICILLIN treatment of MASTITIS*"

say dairymen everywhere!

Squibb "instant-use" tube now used *routinely* by thousands of dairymen!

Dairy farmers throughout the country prefer this new, easy, time-saving method!

At the first sign of mastitis*, thousands of dairymen are giving SQUIBB PENICILLIN CALCIUM OINTMENT VETERINARY treatment *in a matter of seconds.* No preparations to make—no extra equipment! They merely insert tip of tube into teat opening and squeeze out entire contents of tube.

And they report effective results—a high percentage of cures—quarters free from infection—milk production back to normal!

Penicillin is recognized as the *best treatment known* for mastitis*. Now, in *ointment* form it offers the following advantages:

- It is stable, non-toxic, non-irritating.
- It moves smoothly from tube into teat opening—requires no "stripping up" at a later time.
- It floats on the milk in the udder, disperses easily, and the penicillin is released slowly, thus prolonging effective action.

Each tube of Penicillin Calcium Ointment Veterinary contains 75,000 units of penicillin in an adequate amount of dispersing material. This large unitage means that, for most cases of mastitis*, 2 to 4 tubes per infected quarter will be sufficient.

If you have not yet tried Penicillin Calcium Ointment Veterinary—get it from your druggist now. There is no easier way—no more effective way—of treating mastitis* with penicillin! Keep at least half-a-dozen tubes always on hand. Have them ready for instant use!

Call your veterinarian for accurate diagnosis!

*due to *Streptococcus agalactiae,* the cause of the largest percentage of all mastitis cases.

FREE BOOKLET! Gives facts on penicillin and Mastitis Control Program. Write for yours! Address E. R. Squibb & Sons, Veterinary and Animal Feeding Products Division, Dept. FQ-83, 745 Fifth Avenue, New York 22, N. Y.

What dairymen say about Squibb Penicillin Calcium Ointment Veterinary

"I have a large herd of cows, where udder trouble is always prevalent and this ointment is the best cure that I have been able to find. I have also given a couple of these tubes to some of my farmer friends and they also admit it is tops." *Hope, N. J.*

"When we injected her she was milking between 45-50 and showing much garget. After one treatment she showed considerable improvement, after the second shot she had very little garget and within another 24 hours she was apparently completely cured. Her quarter is a little bit slack but she's milking just under 60." *Pascoag, R. I.*

"We noticed your advertisement and bought 2 tubes of Penicillin Ointment from the Drug Store in Lawrence, Kansas. We followed directions to the letter and believe it was the chronic kind of mastitis. We were amazed after 12 hours to find the swollen quarter normal and the milk from this quarter much better. We then gave another tube and 24 hours later found the milk normal and the swelling gone. After 48 hours we had the milk from each quarter tested by the University of———— lab and found the milk normal." *Lawrence, Kansas.*

"I had two very good cows that had Mastitis in 2 quarters each. Used 800,000 units of penicillin in the crystalline form with no results. Also used a sulfa preparation with no results. Have used 10 tubes of your Calcium Ointment and both cows are now fine and back in full production." *Stafford, N. Y.*

"Penicillin Calcium Ointment is indeed a very good product and is giving us good results in our neighborhood. It sure is a sanitary way of treatment for mastitis, a lot better than a syringe." *Greenwood, Wisc.*

"All in all—everyone likes the ease of application and percentage of efficiency." *Drug Store, Bennington, Kansas.*

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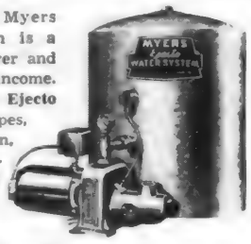
PUMPING EQUIPMENT
for Better Farming

WATER SYSTEMS FOR EVERY NEED!

An automatic Myers Water System is a great work saver and increases farm income. Wide range of Ejecto and Plunger Types, simple in design, quiet, dependable—and fully guaranteed!



SPRAYERS FOR EVERY PURPOSE!

Myers Power Sprayers are fast and efficient, have many advanced features. Gun and boom type models for orchard and field crops, weed control, cattle spraying and other uses.

THE F. E. MYERS & BRO. CO.
Dept. K-95, Ashland, Ohio

☐ Send literature on Water Systems
☐ Send Power Sprayer Catalog

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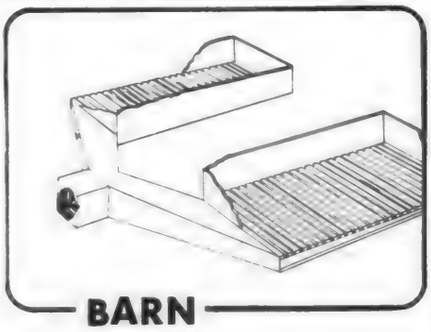
county_____ rfd_____



BARN CURED CROPS are BETTER

Why plant hybrid seed corn or pay a premium for good small-grain seed—and then let excess moisture, mold, rot or some such avoidable evil reduce the value of your crop?

Excess moisture can reduce the feed or sales value of grain crops more than any other single factor.

A Hartzell grain-drying system can stop it!

A simple system such as that sketched above can be easily applied to your present double corn crib. Hartzell dealers have similar economical plans for other type installations.

See your Hartzell dealer today, or write us.

HARTZELL PROPELLER FAN CO.
AGRICULTURAL DIVISION, Dir. Fostle Hills Bldg., PIQUA, O.

Head and kernel blights are the result of later infections that are independent of the earlier root infections. Thus a healthy appearing crop may suffer from a later infection that results in a shriveled, light weight, altogether disappointing yield if there is inoculum present and moisture and temperature conditions are right. Similarly a field which showed considerable root-rot may, under favorable conditions, produce a plump satisfactory grain free from disease.

As a seedling blight or root-rot, the disease develops best in a warm soil. Head blight needs high humidity and fairly high temperatures to develop extensively. This type of damage is likely to be more severe in the corn belt and eastern states and less so in the more northern states or the drier plains region which accounts, in part, for the shifts in barley production which have taken place in recent years.

Disease Preventives

Until varieties with a more satisfactory degree of resistance are available, these farm practices, which have been found helpful, should be followed: Clean seed thoroughly to remove all shriveled, light weight and possibly diseased kernels. Treat seed with an organic mercury compound either by the dusting method or the newer, more pleasant and less hazardous slurry method which can be used with Ceresan M. Practice early sowing of spring barley when possible. Sow on land where barley, corn, or wheat were not grown the year before.

One unsolicited testimonial as to the palatability of the winter barley that the farmers would gladly do without is given by the chinch bugs which pass up oats, wheat and all other crops if they can get to a tender field of barley.

Pro And Con

For centuries farmers have cursed barley for its rough beards that get in their clothes or, still worse, stick in their throats. They have found the rough beards impacted under the tongues of their cattle before the smooth-awned, hooded-awned and awnless varieties were developed. They have compared it with bitterness to the soft, pleasant straw of oats. They have harvested it in the heat of the summer and thought of the cool days when corn ripens. But because barley ripens early it distributes crop risks and affords a better distribution of labor. As a feed grain it permits variety in the animal diet. Grown as a cash crop the proper varieties can be used as stock feed or sold on a ready market to the maltsters.

Barley is in the position of a switch hitter in baseball who can adapt himself to various conditions.

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It's a big part of our business . . . and we have been supplying bird and animal raisers with their wire requirements for many years.

There IS a difference in the quality of these materials, but the BUSSEY stamp of approval has always guaranteed only the very best . . . and large volume purchasing power assures you the lowest price. Send for our catalog "Materials and Equipment for Raising Birds and Animals".

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Performance Records Furnished.
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Write for Information

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ASK YOUR DOCTOR

About the dangers of drinking raw milk.

It may cause such milk-borne diseases as Undulant Fever (Brucellosis) resulting from Bang's disease, Typhoid Fever, Scarlet Fever, etc. The only certain way to make milk safe is to pasteurize it.

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WATERS CONLEY HOME PASTEURIZER

Handy one-gallon size. Entirely automatic. Assures positive pasteurization. Operates on 110 AC current. Carries 90 day guarantee. 29.95 post paid. Order from ad.

WATERS CONLEY CO.
Dept. G
Rochester, Minn.

(Continued from Page 24)

survival on the desert. Indian corn also develops a single large radicle which descends to the sub-soil and finds water at critical times when ordinary corn with its shallow roots would surely dry up. And even when the stalk is poorly developed, Indian corn can produce ears, sometimes longer than half its own length. These characteristics come undoubtedly from centuries of careful selection of seed corn from the best ears of the crop. Navajos did not originate this tradition, but they carry it on faithfully in the choice of seed for corn and all other crops.

"For desert farming you can't beat the Indian methods," Indian Service men say.

The Navajo farmer squats on one knee and with a stick digs a hole eight or ten inches deep. His wife or daughter follows, putting in not two or three kernels, but a small handful; "four for the cutworm, four for the crow, four for the beetle, and four to grow." Sixteen shoots to push their way through the earth's surface, sixteen sprouts to brace themselves together against the spring sandstorms, sixteen stalks to withstand the devastation of desert mice. Then the farmer's wife sprinkles the richer top soil back into the hole, pats it down gently with her foot, leaving a little depression to hold any chance rain, and moves on to the next hole eight or ten feet away. The clusters are planted far apart because there just isn't enough moisture to support them any closer together.

Beans are often planted between the rows of corn, getting the benefit of the shade and wind break of the corn stalks. Melon and squash are usually planted in another plot. Where modern machinery is not available wheat is planted in the same way as corn, with many seeds dropped into one hole. "If you let the wind plant the wheat, the wind will take it away later." And this is literally true, for shallow planted seed in loose soil surely belongs to the wind.

Navajos are reluctant to disturb the soil, for they know that breaking the earth's surface can be disastrous. The priceless moisture can be lost, the wind can blow the field away in a whirlwind of dust, and the delicate plant shoots can be buried in wind drifted sand. So Navajos plow with caution. Under extreme conditions they do not plow at all, nor do they disturb the surrounding weeds that hold the earth and give protection to the young corn. All they do is dig a hole and drop in the seed. Where the soil is firmer and moisture more plentiful, they plow and cultivate with an ingenious tool of their own design. This horse-drawn cultivator looks like a sled and carries a long blade between its two runners. As the farmer rides the sled the blade cuts across the soil a few inches under the surface, loosening the hard topsoil for maximum

GRAND CHAMPION — *at famous* TYFARMS

King Supreme, Oklahoma Grand Champion, 1947. Dam classified "Excellent" with three milk records over 10,000 lbs. 4% test.

At TYFARMS, SACCO V-19 MINERAL is a "MUST"

King Supreme is one of many champions from the long line of fine breeding stock produced at Tyfarms, Tipton, Indiana. Harold Tynan writes: "All our cattle are fed Sacco V-19 Mineral. It gets excellent results from an early age through the growing period, and especially during years of heavy production. Sacco Mineral Feed and Sacco Fertilizer have played important parts in our livestock and grain production for 22 years." Ask your dealer for these famous Sacco products.

THE SMITH AGRICULTURAL CHEMICAL CO.
Plants at Columbus, Ohio, Indianapolis, Ind., Saginaw, Mich., Holland, Mich., Carey, Ohio

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Formula for More Profitable Farming

The SILVER KING TRACTOR

ON MODERN FARMS EVERYWHERE

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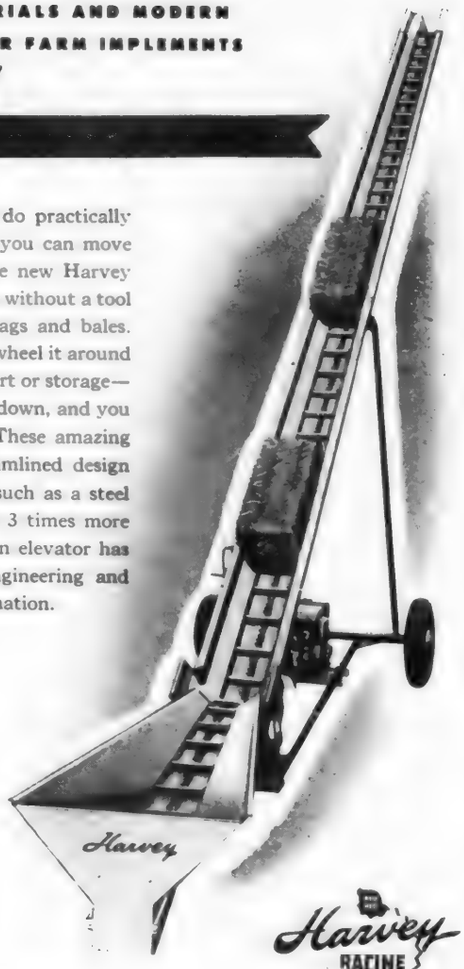
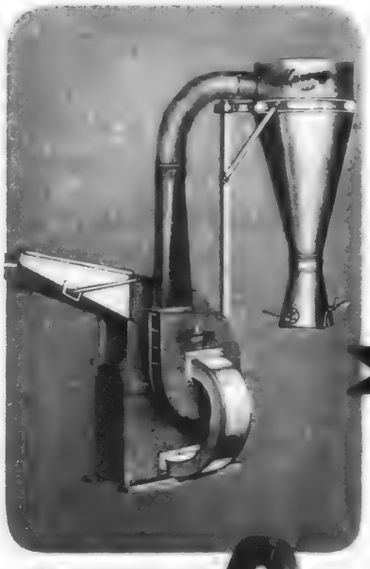
Now you can have an elevator that will do practically every elevating job on the farm and that you can move around with almost unbelievable ease—the new Harvey Elevator. It has 4-position sides, adjustable without a tool to handle anything from small grain to bags and bales. It's so light and well balanced one man can wheel it around all over the barnlot, or fold it up for transport or storage—in a 20-ft. shed. A boy can crank it up and down, and you don't need a jack to hitch it to a truck. These amazing advantages come from revolutionary streamlined design and the use of stronger, lighter materials, such as a steel that is 50% stronger per pound as well as 3 times more resistant to corrosion. For the first time an elevator has been built which incorporates modern engineering and materials. Mail coupon for complete information.

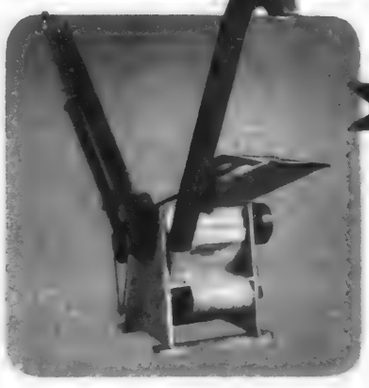


Harvey RACINE



that Grind ⅓ More per Horsepower-Hour

The Harvey Hammer Mill is engineered not only to grind faster but to get rid of the ground feed faster. The cylinder is extra large. Hammers are serrated with 14 notches to hit more kernels each foot they travel. Screen area is extra large, and a super-high-power blower fan makes sure of efficient discharge. Available with tilting feed table as shown, *or with a remarkable self-feeder table*, which keeps output up to maximum—even on roughage.



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42% More Shelling Area

The Harvey Corn Sheller has proved a record breaker for speed and stamina. It's so fast because the amazing Kern-O-Lizer shells inside as well as outside, adding 42% to usual amount of shelling area. An independently operated auger gets rid of the extra corn—no piling up. *Available with new Cob Stacker* of simple, single-chain design which assures automatic alignment of cleats. Cob Stacker also sold separately and can be attached to any model Harvey Sheller in a few minutes.

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water absorption and destroying all weeds without turning over the deeper soil and exposing the field to serious wind erosion. Manufacturers in the Midwest have put such stubble mulch cultivators on the market, heralding them as a revolutionary advance in cultivating. No doubt they are right for the Midwest, but the Navajos have had the invention for generations.

The farmer chooses a plot for dry farming very carefully, usually making use of some underground water table. He plants in the path of water seepage, a declivity in the desert, a basin of rock, or to the leeward of a sand hill which stores water from the winter snows and summer rains, depending on his deep rooted crops to find their way down to water.

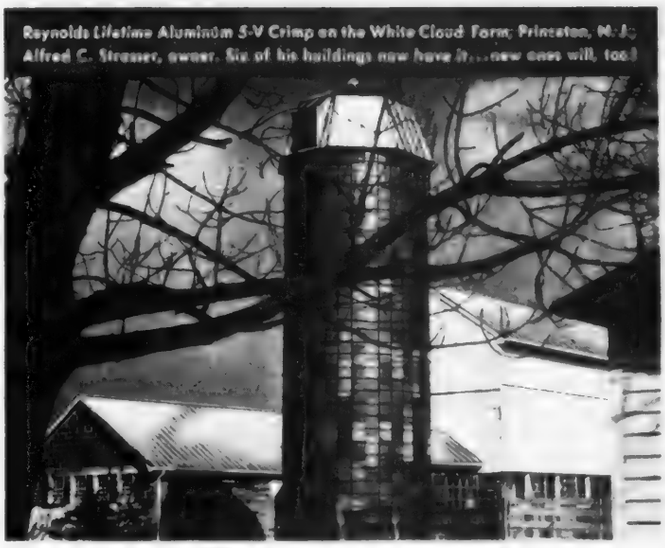
Navajos living in valleys use the spring run-off for one good irrigation. In late April they plow their fields and build dikes around them. Then comes an agonizing wait. If he plants too soon the spring winds will cut the young plants to ribbons; if too late, the wind and sun have dried the streams and his ditch will be filled with dust. When he dares wait no longer he turns the water into his field to soak. Next day he breaks the dike and the water flows onto his next field and so on as long as the water lasts. A few days later he digs his holes and plants. This is his only irrigation, for the summer torrents carry fifty per cent silt and are useless for agriculture.

In a few places on the reservation there are year round springs and streams and on the bigger washes and rivers large storage dams have been built. Here plowing with horse and tractor are possible and conventional irrigation techniques are practiced.

Navajo Economics

The Navajos' only dependable income comes twice a year, in the spring when they sell wool, and in the fall when they sell lambs. Silver and rug weaving are the only other traditional sources of income. As these no longer bring in enough to support the growing population, the Navajos are turning increasingly to wage work. The reservation offers at present only limited opportunities, and most Navajos must leave home to find work to balance the dwindling economy. It is the problem of the off-reservation Navajos that has given us the picture of their inadequate education. Even the returned veterans with three years' service find themselves unequipped to meet the standards of the white world.

Many people are impatient with the slow transition of the Navajos from their ancient life. Every effort is being used to awaken their self determination. Some enthusiasts are even urging the Navajos to take over the trading posts by imposing restrictive regulations on the traders. But others feel that planners who are encouraging business and industrial ambitions among the Navajo people must not forget the importance of helping them get a realistic picture of how our business and



Reynolds *Lifetime* Aluminum 5-V Crimp on the White Cloud Farm, Princeton, W. Va. Alfred C. Strasser, owner. Six of his buildings now have it...new ones will, too!

Reynolds *Lifetime* Aluminum Corrugated on the Leatherwood Farms, Bluefield, W. Va. The owner comments particularly on how much cooler these barns are in summer.

Portable AND PERMANENT

any farm building is better built with Reynolds *Lifetime* Aluminum roofing and siding

THE light weight of Reynolds *Lifetime* Aluminum makes your portable buildings easier to move as well as easier to build. Rustproof, it needs no painting. Fire-resistant, rot-proof, termite-proof, it lasts indefinitely—saves seasonal repairs. And with no rust to loosen nails, you can keep buildings tight—keep rats out.

Aluminum reflects up to 95% of radiant heat... takes off the sun load, helps retain winter warmth. It reduces summer temperatures as much as 15°. Better for poultry and livestock, safer for stored grain!

What's best for small buildings is also best for your house and barns. Reynolds *Lifetime* Aluminum will modernize your farm's appearance, cut maintenance expense, stretch the low initial cost over many years, and increase your comfort.

Let Reynolds help you build better with this better material. Ask your dealer for Reynolds *Lifetime* Aluminum.

REYNOLDS METALS COMPANY, BUILDING PRODUCTS DIVISION, LOUISVILLE 1, KY.

new embossed corrugated

New beauty, new strength and rigidity in Corrugated Roofing and Siding . . . because it's now embossed by a Reynolds-perfected technique. Handsome stippled surface. Feels thicker, stouter, stronger. Looks like a million, yet its cost is low and the economies big. In both 2½" and 1¼" corrugation sizes. Three thicknesses—.019", .024" and .032". Be sure to see Reynolds Lifetime Aluminum Embossed Corrugated . . . *at your dealer's now!*

Reynolds Pioneering made Aluminum Competitive . . . *take advantage of it!*

IF YOU SEE RUST YOU KNOW IT'S NOT ALUMINUM

REYNOLDS METALS

REYNOLDS *Lifetime* ALUMINUM BUILDING PRODUCTS

WORLD'S LARGEST PRODUCER OF ALUMINUM BUILDING PRODUCTS: Shingles, Clapboard Siding, Corrugated and 5-V Crimp, Snap-Seal and Standing Seam Roofing, Weatherboard Siding, Nails, Gutters, Wall Tile, Casement and Picture Windows, Reflective Insulation, the "Alumi-Drome" (prefabricated farm and commercial utility building)

...It Pays to Raise
BERKSHIRES
..BRED FOR MEAT..

OUTSTANDING FACTS

- Berkshires . . . Carlot Grand Champions, eight straight years at Chicago.
- Berkshires . . . have won more Pork Carcass Championships, in the past 25 years, than all other breeds combined. This includes both Champion and Reserve at the last two Internationals.
- Berkshires have 19% more lean in the loin, 10.6% more meat in the ham, 12.4% thinner covering of fat over the backs according to Cornell University tests.
- Berkshire breeding has been dominating the Great Indiana ton litter contest and show.
- Berkshires are the leading meat type breed. Give cheaper gains . . . more valuable on the market.

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we're in this up to your neck!...

Ice Cream Manufacture is a neck and neck proposition with farming -- for as our gallonage grows (it's now nearly a billion annually) so does the dairy farming that supplies it.

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industry functions. Many students of this problem say, "Continued subsidy or economic protection will not really help them. Unless they learn to meet the legitimate competition of the white world they will never be able to 'stand on their own feet,' but will remain dependent on the government."

Education

During most of the half century that we have been trying to educate the Navajo both the Indian Service and the missionaries have started with the assumption that to educate an Indian you first had to strip him of every vestige of Indian culture. The Navajo language was forbidden, the home life was considered an evil influence, and Indian ceremonies of any kind tools of the devil. The result has been that after four or five years the child is sent back to his family, hopelessly split between the white man's world and his Indian culture. He is not "Americanized," for a new culture is not assumed so easily. He has been told that everything his beloved parents did was wrong, but he has not been given any better tools to take the place of Navajo ways. He has neither learned to make a better life on the reservation nor to find a new home for himself elsewhere.

During the past fifteen years tremendous efforts have been made to establish a program that would preserve the Indian's personality, and at the same time give him the benefits of modern education. The plan is now to cause as little break as possible in the child's home pattern and to base the educational program on the pattern he knows. To the surprise of many people, the old people show no great prejudice toward education as long as it does not attack their culture or disrupt their homes.

One of the newest programs is the development of written Navajo. Many teachers believe the children will learn to read and write faster in their native tongue than in English. In a few schools today both children and adults are being taught to read and write the Navajo language on an experimental basis. These classes may develop into a reservation-wide program if they are successful.

The Krug Plan

With 60,000 Navajos living on a reservation that can only maintain 20,000 on a minimum standard it is evident that either the land must be made to produce more or some of the people must leave their homes. Secretary of the Interior, Julius A. Krug, proposed a plan designed to do both of these things. Soil conservation, irrigation projects and range improvement would be used to increase the productivity of the land and a large group of Navajos aided in finding a place in the white world. The Secretary has asked Congress to appropriate $90,000,000 to be spent over a ten year period for the rehabilitation of the Navajo and the Hopi, whose

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reservation lies within that of the Navajos.

Under the Krug plan additional schools would be built and educational facilities expanded. Along with this would go a health program and additional hospitals. The isolation in which these people live would be broken by construction of new roads and the improvement of old roads and trails. To improve communications in the territory telephone and radio facilities would be increased and air transport within the reservation would be promoted.

Soil and water conservation programs would aid the dry farmers and the herdsmen would benefit by the range improvement program, which is part of the plan. Irrigation projects now under way would be completed and extended to add 58,500 acres of irrigated land to the 23,000 acres already under water.

A small amount of the total fund would go toward the development of community enterprises and industries and a revolving loan fund would be made available to individual Navajos to establish themselves in business or to acquire capital equipment. It is estimated that with all of these improvements the number of Navajos that the reservation can support could be raised from 20,000 to 35,000.

The Forgotten Surplus

This leaves 25,000 Navajos who cannot expect to make a living on the reservation. What of them? Under the plan 1,000 Navajo families, or about 5,000 people would be resettled on a new irrigation project below Parker Dam on the lower Colorado River. This is Indian land and is open to any Indian groups in the Colorado watershed. The remaining Navajos would be helped in finding employment and adjusting to industry and agriculture off the reservation.

In the long run there is only one way the Navajos can continue to live in their beloved Navajo country and continue to expand—by shifting from a loosely knit herding economy to an intensive community economy. A community on the Navajo reservation requires much more substantial agriculture than desert type subsistance farming. And the Navajo sheep herder will develop intensive or commercial agriculture only as he gets positive proof that he can live better by farming full time in the irrigated valley than he can alone with his sheep.

Johnny Chee and the people who make up his world must eventually meet the white world on an even footing. This is a long term program that involves not only Johnny himself but his children and grandchildren too. It involves changes and adaptations of the Navajo culture to survive in an industrial world. To accomplish this, these early Americans must, to some extent, become Americanized.

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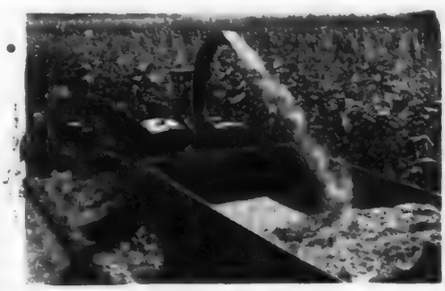

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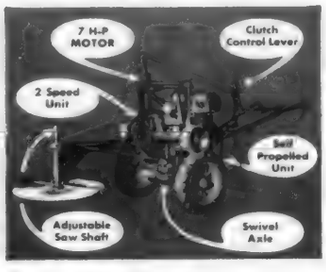

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the OTTAWA BUZZ MASTER takes one of the toughest jobs on the farm off your hands. The Post Hole drill has a double flight auger — real 'he-man' power. Digs a hole 3 ft. deep in 25 seconds. All controls in easy reach of the operator.

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the BUZZ MASTER, equipped with Rotary Tiller attachment, increases crop yields. Pulverizes the soil, prepares better seed beds, ready to plant. In one easy operation; mixes in cover crops and fertilizer, helps retain moisture, rebuild the soil. Tills 25 inch swath.

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PHEASANTS

(Continued from page 51)

Dampness and sudden weather changes may be disastrous for young birds. Clean, dry brooder houses are essential to avoid possibilities of pneumonia. Modern chicken brooder houses are very satisfactory, though the young birds will probably have to be chased into them at night or during rainstorms. A pheasant's normal instinct is to take shelter in natural cover, such as brush, deep grass, or when small, under a broad leaf or tuft of grass. For young birds not fully feathered, this is not sufficient.

Another serious problem is that of predators. An accumulation of game birds in any area causes an influx of predatory birds and animals. Mink, weasels, skunks, opossums, foxes, great horned owls, some hawks, and some two-legged predators with guns all have a keen taste for pheasant flesh.

Animals climb over or burrow under the fence; feathered enemies strike from the air. Great Horned owls are especially fond of pheasants and are not easily discouraged. A sure discourager is a charge from a 12 gauge shot-gun. However, this huge bird, being a perch feeder, may frequently be captured by using pole traps. Owls do not rush in for the kill; they land on the nearest perch and carefully make a selection from the menu. They may take their prey back to the perch, or return to it after eating. A Wisconsin breeder caught 48 Great Horned owls in pole traps in one year. Yet on this same farm one pair of owls killed 200 pheasants in a three month period without getting near the traps. Floodlighting the area frightened them not in the least. Finally the owner ambushed them and ended their reign of terror with a shot-gun blast. Each had several toes missing, apparently the result of previous experience with pole traps.

This is not all the grief that the pheasant raiser may suffer. Confined birds may injure themselves flying against the pens; they are subject to delicate variations in the nutritional values in their feed; eggs may lack fertility; faulty mechanical incubator machinery may go on the blink. The wise breeder expects the worst at all times.

The Pheasant I.Q.

Of all the fowl, turkeys are the giddiest; pheasants are a close second. They will crowd and pile at water fountains and in brooder houses till those at the bottom are smothered. From Knight's Pheasantry in Des Moines, Iowa, comes this story: "One hot afternoon a water container was accidently tipped in a pen of young pheasants. They all got thirsty. After it was refilled a number of them drank so much water they drowned themselves standing by the fountain."

Mrs. Leola Perkins, Oconomowoc Game Fields, Oconomowoc, Wisconsin, once found six young birds firmly anchored to a clod of earth by six clover stems. Each bird had swallowed a white clover blossom, the stems of which were still clinging to the ground.

Young chicks may eat till their knees buckle; they'll eat string and labels from the feed bag as readily as they eat the feed. Two Oconomowoc Game Fields chicks once lunched on a piece of string, one from either side. When discovered they were standing beak to beak, neither giving an inch.

Once in a while, just to add to the fun of raising pheasants, one will change sex, even after reaching full plumage.

Pheasants are wary and shy and rarely become friendly. They retain their instinctive fear of man and animals no matter how carefully treated or how frequently handled. There are rare exceptions. Occasionally, a pheasant will take a fancy to his owner and follow him around like a dog. L. N. Taylor once released 5 Golden cocks, hoping they would stay on his farm and really become ornamental. Of the 5 only one remained to become a pet. He followed Taylor constantly, begging peanuts, for which he had a fondness.

Feed is the big item in the cost of raising pheasants. A large scale Wisconsin breeder turning out 10,000 birds a year estimates his feed costs at $2.00 to $2.25 per bird if kept to the age of six months. His total cost of raising birds to table size averages from $3.00 to $3.50 each. Cost of living note: In 1940 the feed costs averaged 80c per bird instead of the present $2.00 or $2.50.

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Elevator trough lengths 20', 24', 28'.
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Elevator trough lengths 32', 36', 40'.
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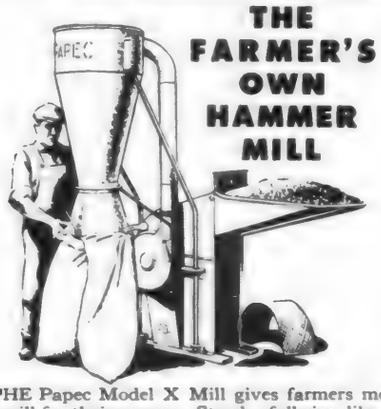

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PAPEC
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At the age of six to seven months these birds, when dressed, weigh from 2½ to 3½ pounds and sell for $5.00 each.

Breeding birds, if carried through the winter months, have a somewhat higher price tag on them because of the four or five months additional feed costs and because they are in greater demand during the breeding season. Most raisers buy their breeding stock in the spring to take advantage of the lower prices.

Pheasants to be used for game purposes, field trials or restocking, are bought by clubs and organizations in early fall before reaching full weight. They must be able to fly and must be in full plumage. Depending upon their age, and the quantities ordered, these birds sell for $3.50 to $4.00 each.

Pheasant eggs range from free (from state agencies) to $3.00 per dozen. Day-old chicks range up and down from 40 cents each.

Private Breeders Licenses

Private individuals raised thousands of pheasants before the states got into the business, and they still do. While breeders are not required to take out Federal permits most states have regulations with which breeders must comply. State regulations vary somewhat, but those in force in Wisconsin are indicative of most state requirements:

1. No fee is required if the raiser does not plan to commercialize.
2. The initial license fee for a commercial game farm is $5.00—annual renewal fee is $2.00.
3. The licensee must purchase from the State all wild pheasants on the premises. All pheasants on the premises thereafter belong to the licensee. The census of number of wild birds is determined by a three man board—one appointed by the commission, one by the licensee and the third by the other two appointees.
4. The farm must be fenced in accordance with commission recommendations.
5. All birds sold, dead or alive, must be tagged.

The Hobbyists

Those who make a hobby of pheasants confine their efforts to the more exotic, ornamental varieties rather than the more commonplace meat varieties. Fred Sturgis of Harleysville, Pa., for example, raises only rare birds. He has Tragopans, Mikados, Imperials, Impeyans, Brown and Blue Manchurians, Edwards, Elliotts, and Cheer pheasants. Charles Gillette of Gurney, Ill., on the other hand, raises ornamental varieties on the bus-man's holiday plan. He says, "I work an average 10 hour day raising 5000 Ringnecks and then relax by tending to the ornamentals."

Breeding stock of such varieties as the Golden and Silver may be obtained for as little as $10.00 per bird, while some of the rarer type run much higher; Kornean Firebacks and Imperial Kaleeges

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cost $100.00 each; Grey Peacocks, $200.00 each.

Breeding stock of the ornamental varieties are most commonly bought in trios, 2 hens and one cock. For the meat varieties the hen ratio is higher, 5 or 6 hens to each cock. Pheasant hobbyists carry on a lively trade among themselves, like stamp collectors. They usually deal only in purebred birds.

Pheasant breeders read The Modern Game Breeder Magazine, published in Doylestown, Pa.; The More Game Birds In America Foundation, feed and firearms companies, and state game commissions supply information and advice; The U.S.D.A. has published a popular bulletin, Farmers Bulletin 1613. The U.S. Bureau of Biological Survey, a large contributor to our knowledge of game resources, also supplies information.

Three associations represent most of the big and little breeders: American Pheasant Society, President, Jean Delacour, New York City; Western States Pheasant Society, President, Claude Hooke, Napa, California; and California Game Breeders Association, President, G. E. McDorman, Alhambra, California.

The States Are In The Business

Natural game birds such as the prairie chicken, grouse, and quail, whose numbers are rapidly diminishing, are considerably more difficult to raise in captivity than are pheasants. For this reason state game commissions have been quick to replenish hunting areas with the large colorful, fast-flying Ringnecks.

In 1880 the first purebred Ringnecks were released in the Willamette Valley of Oregon by Judge O. N. Denny, United States Consul General at Shanghai. He liberated 47 Eastern Chinese Ringnecks in that area and in 1892, the first open hunting season, approximately 50,000 pheasants were killed.

Within a few years after their introduction pheasants were being produced and released by the thousands. As early as 1928 the Wisconsin State Conservation Department through its Experimental Game Farm at Poynette, was distributing hundreds of thousands of pheasant eggs to sportsman's clubs, farmers, and 4-H clubs. In 1936 Wisconsin inaugurated a program of distributing day-old chicks to organizations which could provide brooder houses or shelters but had no means of hatching eggs.

Wisconsin like many other states, also has a specific plan for the release of mature birds in practically every one of its 71 counties. Most of the northern tier of states have some plan for stocking pheasants for hunting. Many game commissions offer advice to breeders and sell or give eggs and birds to qualified individuals and organizations.

In Iowa the first release of pheasants came about quite by accident. Near Cedar Falls one stormy night pens containing 2000 Ringnecks blew apart, and all the

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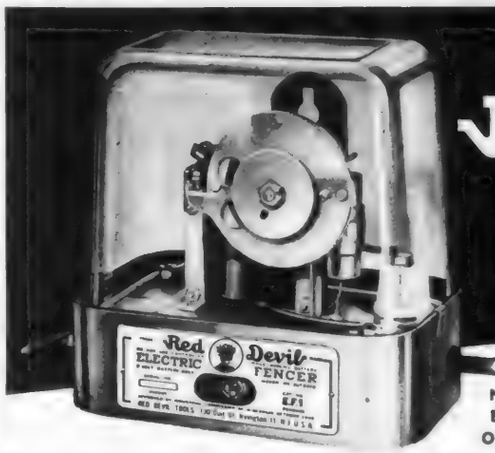

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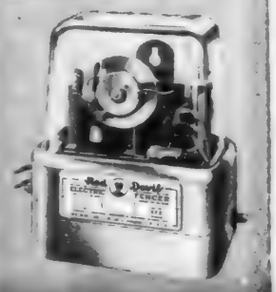

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Whether for farm or factory, business men measure the value of equipment by its dependable low-cost operation. So, on farm after farm where equipment has been chosen by a business-owner, the choice is Louden. Ever since 1867, Louden has specialized in designing EFFICIENT barn equipment. And farmers with Louden-equipped barns have saved time, labor, feed — and MADE MORE MONEY.

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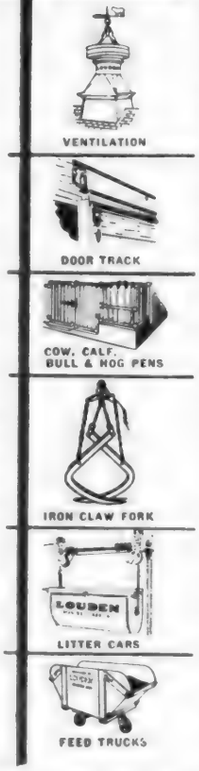
Whenever you inspect a Louden equipped barn, you see utility combined with eye-appeal. And operating figures will show that Louden equipment INCREASES FARM PROFITS. So—when you're in the market for ANY barn equipment, it will pay you to get in touch with your Louden dealer. You may know him already — but if not, write for his name and address.



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birds escaped. Iowa now releases thousands of birds each year.

New York State opened its first game farm at Sherburne in 1909 and during that year produced 1200 pheasants and 6500 eggs. Today the state's output is measured in the hundreds of thousands.

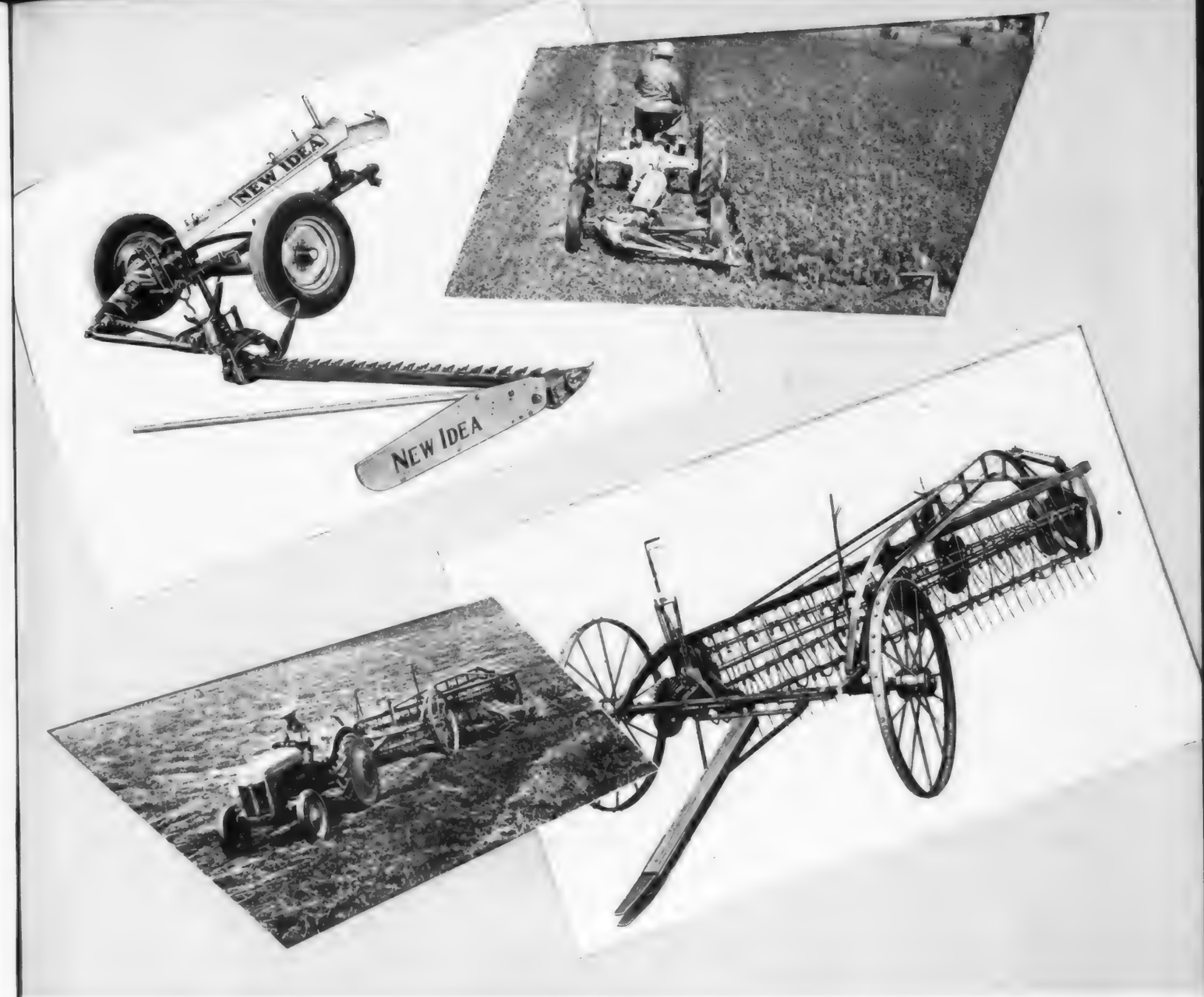
Willie Harris, Calhoun County, Ala., a 4-H pheasant breeder.

In South Dakota, the happy hunting ground of all pheasant hunters, some 30,000,000 birds have been killed since the first open hunting season in 1919. South Dakota's bird bonanza started in a modest way. In 1891 Dr. A. Zitlitz of Sioux Falls released a few pheasants he had imported from Oregon. Between 1891 and 1912, when the State Game Commission began releasing birds, a few other individuals raised or imported birds from other states and released them. In the seven years following 1812 the Game Commission had purchased and released 7000 birds, at a total outlay of less than $20,000. The countless birds in the state today came from this small beginning. Pheasants multiply like guinea pigs in South Dakota and the state no longer raises them, confining its activities to shifting the population when it thins out in over-hunted areas. The Sand Lake Wildlife Refuge near Aberdeen once transplanted 15,000 birds without making a noticeable dent in the local supply. It was here that was found the greatest known concentration of pheasants in America, more than 5 birds to the acre! The sale of licenses to out-of-state hunters is one of South Dakota's big sources of revenue.

Other states have had varying success in stocking, depending on how near the stocked areas approach the conditions in Dakota, which seems to be just what the Ringneck wants. The pheasant apparently is not a hill bird, preferring the grass covered plains, and he does not do well in the South. He moves out of regions infested with predators, and is especially allergic to foxes

Take It Easy

Whether you raise pheasants for meat or as a hobby, the advice of those already in the game is to start in a modest way: first learn the habits and eccentricities of the bird and grow as your experience grows.



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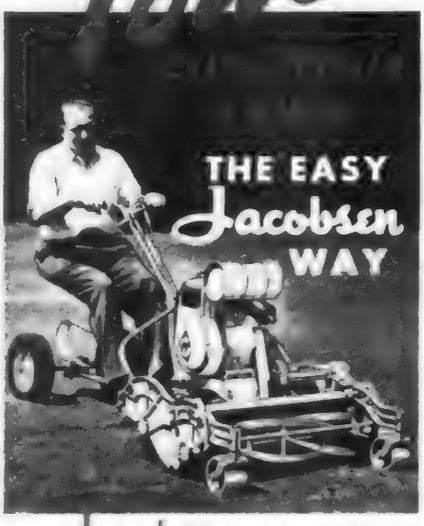

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3 hp. engine. Riding sulky optional.

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Engineered throughout to handle big volume cutting, the Park 30 is a mainstay at parks and estates . . . the right machine for any large area grass-cutting job.

For lawns of substantial size, the Lawn King and Estate 24 do outstanding jobs. For smaller lawns the Lawn Queen and Bantam power mowers are country-wide favorites.

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DEATH TO WEEDS

(Continued from page 61)

larger corn. Following spraying, many of the small corn plants become brittle and are easily broken by high winds.

Wheat, Oats and Barley

The experimental evidence to date indicates that winter wheat is the most tolerant of all the spring grains. One-half pound of actual acid per acre is the safest maximum for the control of mustards, ragweed, sunflower and similar susceptible varieties.

Excellent results have been obtained from 2,4-D dust compounds. This method of application is economical, particularly in the Great Plains area, where large acreages of cereal crops have been successfully treated for weed control. For best results the ground-type duster should be equipped with a low velocity fan and a wide dust boom which can be adjusted close to the crop in order to minimize the danger of drift. Applications made in the early morning or late evening when a light dew has fallen reduce the danger of drift, and apparently increase the efficiency of the dust applications.

Pastures

Pastures can now be freed of the competition of weeds. 2,4-D is effective against ragweeds and other common weeds that sap the food and moisture which should go to grasses and legumes. The biennial and perennial weeds are easily killed after they have completely emerged from the ground and before they reach the full bloom stage. Wild onion can be killed by 2,4-D and this alone endears it to farmers. Spring or fall is the best time to spray pastures. For more complete control the field can be retreated in the fall following an early spring application, or the following spring after the new growth has started. Each application will require from three quarters to one and one-half pounds of 2,4-D acid per acre, depending on the weather conditions and the weeds being treated. Legume pastures cannot be safely treated with 2.4-D.

The Garden

Home gardeners should stick to the hoe in keeping weeds under control. 2,4-D is not the best thing that can happen to most garden crops. Tomatoes, beans, and most other vegetables commonly grown in the garden being predominantly broad-leaved, can be killed by 2,4-D as easily as can the weeds that compete with them.

Lawns

City people too are interested in 2,4-D. It is excellent for control of broad-leaved weeds in lawns except where the bent grasses or clovers are the predominant plants. Early spring or late fall are the best times to treat the lawn.

As a general rule one pound of 2,4-D acid in the form of sodium salt per acre

Compare

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Every "Ottawa" Hydraulic Front End Loader is guaranteed to out-perform and out-last any loader on the market or your money will be cheerfully refunded.

Actual service under toughest farm conditions back our GUARANTEE that the OTTAWA FARMER Hydraulic Loader will—Lift up to 3,000 pounds—Raise loads over 8 feet—Fill, raise and dump fork load in 30 seconds. The OTTAWA LOADER is engineered to last the life of your tractor, with ordinary care. Operates from tractor seat, assures clear vision, easily attached or detached, saves manpower, puts tractor power to work.

Bulldozer blade, Sweeprake and Haystacking attachments available. Available for Most Models of Row Crop or Four Wheel Standard Make Tractors. *Immediate Delivery.*

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Use Warp's SPECTRONIC TOP QUALITY

WINDOW MATERIALS

THEY SUPPLY SUNSHINE SUPPLEMENT D*

HOLD IN HEAT - KEEP OUT COLD - CUT WITH SHEARS AND TACK ON

IT PAYS OFF

38% FUEL SAVING

This test of Warp's Window Materials was made on a modern, insulated, 16-room brick house, heated by gas, in winter weather averaging 29° F. Inside temperature thermostatically controlled at 72° F. day and night. For one month, *without* storm windows, gas used cost $31.50. But the next month, *with* storm windows of Warp's Material, the gas used cost ONLY $19.50!—A cash saving of $12! This 38% saving would have been EVEN MORE if test had been made on poorly insulated house with no weather-stripping around doors and windows.

WYR-O-GLASS

A tough galvanized, fine wire base — ½ inch mesh. Every joint and wire imbedded in a cushion plastic for double reinforcement. Transparent Plastic applied on both sides, fusing everything into one solid weatherproof sheet. Highest Ultra-Violet transmitting and most transparent, flexible Window material on the market.

WARP'S SPECTRONIC WINDOW MATERIALS LET IN BENEFICIAL SUN'S RAYS

Vitamin D rays from the Sun, promote growth that you can't get with home grown feeds alone*, chicks grow faster — hens lay better — pigs and livestock thrive with the action of these healthy rays, which glass shuts out.

(Farm grown feeds do not contain Vitamin D)

The name "Warp's" on every yard guarantees years of Satisfaction

Especially recommended for use on

Poultry House Windows	Storm Doors	Hotbeds
Porch Enclosures	Barn Windows	Cold Frames
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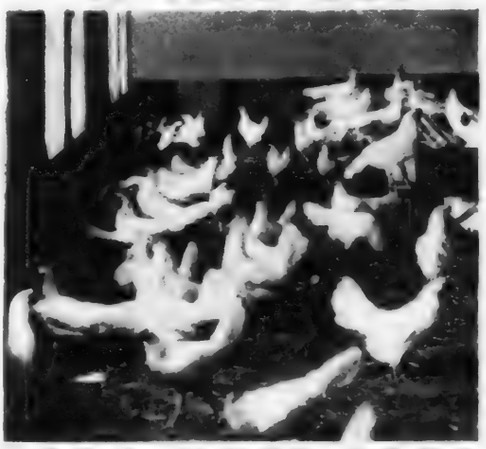
Flexible As Window Screen

IT PAYS OUT

Tests at Warp's Experimental Farm showed that pullets started laying when only 5¼ months old, layed 90% more eggs during the first two months, when kept under Warp's Spectronic Window Materials, as compared with hens kept under common glass. Identical rations, consisting chiefly of farm grown grains,* were used for both test flocks.

Poultry and livestock *must* get Vitamin D. Why not let the Sun do it, instead of buying expensive Vitamin D. Warp's Window Materials are guaranteed to let in these valuable rays, which ordinary glass shuts out.

(Farm grown feeds do not contain Vitamin D)



90% MORE EGGS

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GLASS-O-NET

Very transparent. Made on ½ inch mesh, strong, green Cord base—Every Cord soaked in waterproof Plastic to make a moistureproof seal—and to add greater strength. Transparent Plastic then applied on both sides, sealing everything into one solid weatherproof sheet. Extra high Ultra-Violet transmission.

SCREEN-GLASS

Fine Mesh Wire Base. Extremely Durable for Long Service. Galvanized wire screen cloth imbedded in a solid sheet of exceptionally clear, waterproof plastic which transmits and diffuses over 50% of the sun's Ultra-Violet Rays. Shatterproof, unbreakable and airtight. As flexible as window screen.

All Warp's Window Materials let in the Sun's healthy rays.

FLEX-O-GLASS

Absolutely Waterproof — Unbreakable. 124 strong, preshrunk threads per square inch. Impregnated with extra high melting point Composition that will not run, discolor or melt in a window. Extra Heavy. Extra Durable. Guaranteed 2 years. Admits lots of healthful Ultra-Violet Rays from the sun.

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CHICAGO, ILL.

Pioneers and Leading Producers of Flexible Window Materials

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prevent this!

Working his farm pays off for the farmer. But time lost repairing or replacing culvert-bridges, posts, barns, and other wooden structures, is not profit-time.

Use Pentachlorophenol-treated wood—wood which will last double and triple the life of untreated wood—it's good insurance against costly and time consuming repairs.

Pentachlorophenol is a *tested* wood preservative that gives lasting protection against decay and insects. Yet it has no offensive odor and is easy to handle.

Ask your lumber dealer about Pentachlorophenol-treated posts and lumber —or write direct to Dow.

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Use modern treated wood!

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DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

REDUCE BUILDING REPAIRS! Write today for illustrated, free booklet telling all about this modern wood treatment. Ask for booklet PE108.

gives excellent weed control on lawns. This is equivalent to one ounce of actual 2,4-D acid for 3000 square feet of lawn.

Care must be taken to prevent the drift of the chemical to gardens and ornamental plants.

Accurate coverage with a compressed air or knapsack sprayer can best be obtained by laying out the lawn in strips separated by string. A strip three to four feet in width is a good area to cover with any hand sprayer. By staking out lawns with a cord or string divider, one can be sure that the entire lawn is properly sprayed in sequence without the danger of overlapping or skipping some area.

COAST TO COAST

Research for this article took Dr. Myron S. Hazen from coast to coast and to the major research laboratories of the country. He found a wide difference of opinion everywhere. His conclusion; "There is no general rule for 2,4-D. About 1956 we'll know more definitely what it will do." Even though he backs all of his statements up with U.S.D.A., experiment station and weed control conference reports, he expects some difference of opinion. Hazen is well known as a farm consultant and has done outstanding work on pasture improvement.

The woody growth along fence rows, including such pests as poison ivy and poison oak, can be set back but seldom killed with a single application of 2,4-D. It kills the leaves but not the roots. Where the growth occurs in non-cultivated areas the best answer is not 2,4-D, but Ammate, which will do a quicker and more thorough job than the repeated applications of 2,4-D.

One pound of Ammate per gallon of water is excellent for non-cultivated areas. In orchards it is safer to reduce the concentration to one-half pound per gallon of water. Spray lightly with low pressure to merely wet the foliage and not the ground. This is especially important on lighter soils or where tree roots are near the surface. To the orchardist fortunate enough to have no poison ivy beneath his trees 2,4-D will clean out the broad leafed weeds and leave a carpet of grass.

Spraying Equipment

With the coming of 2,4-D there were improvements in sprayers and their attachments. Satisfactory coverage can be obtained with almost any kind of equipment from the small knapsack to the tractor drawn power sprayers, but old style sprayers have their drawbacks for the use of 2,4-D. Before the large high pressure power sprayers are used for weed killing, the pressure control regulator should be changed to make the maximum pressure not more than 100 pounds per square inch. In addition the sprayer should be fitted with special nozzles that deliver a fan-shaped spray rather than the cone-shaped spray commonly used for fruits and

vegetables. The combination of low pressure and fan-shaped spray gives better efficiency in coverage of weeds and reduces the danger of drifting the weed killer into other crops. With fan-shaped spray nozzles and low pressures as little as three to five gallons of liquid will cover an entire acre. With the use of airplanes and special spray equipment even smaller amounts of spray have been used successfully. Spraying from the air is faster than ground application and costs from two to three dollars an acre.

The supply of ground types of spray equipment hasn't been able to keep up with the demand. This has led many farmers to convert their old insecticide sprayers to the use of 2,4-D. Others have built sprayers from the ground up. The jeep with a boom for the nozzles along the front bumper and a tank and pressure pump in the back seat has proved its worth. Tractors have been mounted with similar equipment. Farmers in Henderson County, Kentucky, in the summer of 1947 found that they could equip their tractors for about $35. They could then spray 80 acres a day covering four rows at a time with five gallons of spray per acre. The sprayer traveled at four miles an hour and the tank carried 35 pounds of pressure.

Take Care

The farmer who uses his insect spraying equipment for spraying 2,4-D must be especially careful to clean it thoroughly before using it for regular insect work again. The residual 2,4-D can remain in the tanks and tubes and be dissolved by insecticides and sprayed on plants which may be susceptible. Strong solutions of household ammonia in water (2-4 teaspoons per quart of water) or trisodium phosphate at the rate of one pound to 25 gallons of water can remove the 2,4-D if the equipment is thoroughly washed with the solution.

The most serious disadvantage of 2,4-D is that it will kill susceptible cultivated crops as well as weeds. Even small quantities of drift either as mist or dust have caused serious crop losses.

In many cases 2,4-D's inability to kill the grasses is a disadvantage, but if it had this power it would also kill the cultivated grass crops such as corn and small grains.

While it has no prolonged effect on the soil it may remain in the ground for as long as three or four months, in concentrations strong enough to damage germinating seeds. Broad leaved plants should not be planted in 2,4-D treated soil until 60 days after treatment. Grasses and small grains are safe after 30 days.

Other Herbicides

While 2,4-D has proved the most important development in chemical weed control, there are still many weeds and many situations where its use does not give satisfactory results. The following brief summary represents the latest available information on the important herbicides other than 2,4-D.

1. *Sodium Chlorate.* Sodium chlorate and the various proprietary mixtures to which other chemicals, like borax or sodium carbonate, have been added to reduce the fire hazard, are recommended for treatment of small areas of perennial weeds where quick elimination and complete eradication are desired. It may make the soil sterile for two to four years.

2. *Dinitro Herbicides.* These products are generally recommended only for the control of annual weeds on crops which are sensitive to 2,4-D, such as canning peas, field peas, and new seedings of alfalfa.

3. *Borax.* The use of borax as a weed killer is limited to the semi-permanent destruction of weeds, grasses and woody shoots. An application of from 20 to 30 pounds of commercial borax, or 20 pounds of borax plus three pounds of sodium chlorate per square rod, is required for the complete destruction of most resistant vegetation.

4. *Ammonium Sulfamate (Ammate).* Ammate gives quick elimination of poison ivy and poison oak.

This material may also be used for killing tree stumps and the elimination of sprouts. From two to four ounces of dry salt for each six inches of the diameter of the cut stump should be applied to the freshly cut surface of the stump or sprouts.

5. *Cyanamid.* Excellent weed control has been obtained from

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In normal car use

The new Auto-Lite Sta-ful battery helps provide full power to spin cold, stubborn engines for fast winter starting

Helps prevent major cause of battery failure—saves you service time.

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A better battery for farms

Sta-ful is the kind of battery farmers have been looking for—a battery with more power, longer life, less servicing, less grief and greater protection against battery failure from liquid loss. Plates in Sta-ful stay fully covered and active when the same liquid loss leaves ordinary battery plates exposed and inactive. See your neighborhood Auto-Lite Battery Dealer for a demonstration. Prove to yourself why Sta-ful is a better battery to help farmers save time and money.

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Plates at left are kept fully covered because of the big liquid reserve in the AUTO-LITE Sta-ful Battery.

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Liquid level shown in both batteries after equal evaporation

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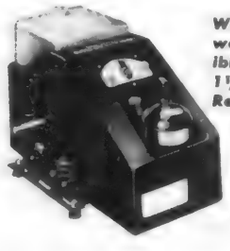

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Special features include fingertip dial speed control, automatic transmission, flexible shaft adapter and many more. Write for free Multi-Tool catalog. Continental Motors Corp., Multi-Tool Division, 620 Ford Bldg., Detroit 26, Michigan.

the use of two or three applications of either the granular or the dust type of *Cyanamid* on asparagus beds. The annual application of approximately 400 pounds per acre is required. One-half of the total amount should be applied in the early spring before growth starts. The next application should be made after the bed has been cut and before the new sprouts have an opportunity to erupt.

6. *Stoddard Solvent.* This material at the rate of 50-60 gallons per acre applied directly over the rows, or 100 gallons per acre as an over-all spray, is suggested for the control of weeds in carrots, parsnips, caroway, and dill.

2, 4, 5 *Trichlorophenoxy Acetic Acid.* A number of workers feel that this one may prove superior to 2,4-D for control of woody plants.

IPS (Iopropyl Phenyl Carbamate). IPC has not proved to be a satisfactory weed killer for general use.

Oils on Sugar Beets

From California comes word of encouraging weed control in sugar beets by pre-emergence spraying with Diesel oil. This material was selected for the trials because it is readily available at a relatively low cost.

These tests were conducted on fall fitted land which was allowed to remain undisturbed all winter. The field showed a good growth of winter weeds largely in the seedling stage. Sugar beet was drilled with a precision drill on February 24 and March 12 at rates of from four to five pounds per acre.

Here is a summary of the advantages of pre-emergence spraying for sugar beets as reported by these research workers:

1. It permits the preparation of seed beds in the fall, their subsequent settling during the winter, and seeding without any reworking of the beds.

2. The beet seedlings emerge in a weed-free soil, and lacking competition, make rapid, vigorous growth.

3. The first cultivation after emergence may be delayed until the seedlings have attained considerable size:

4. It favors the use of the precision drill, and a low rate of seeding.

5. It reduces the cost of blocking and thinning, probably making possible the accomplishment of these two operations in a once-over with the long-handled hoe.

Numerous petroleum products offer inviting fields for further research, particularly on crops that are damaged by 2,4-D. Selective lighter stove oils are being used on carrots, celery, parsley, and parsnips.

ATA (Ammonium Trichlore Acetate). Some of the really "tough" grasses like Quack grass, Bermuda and Johnson grass, are at least partially controlled with this chemical.

Soluble Cyamids. Calcium Cynamid in addition to being a herbicide may have some fungicidal properties, and when its reaction is completed, the residual materials act as a fertilizer.

Puratized (Phenyl Mercuri Triethanol Ammonium Lactate). This organic mercury compound was originally synthesized as a fungicide. Under certain conditions, it caused serious injury to foliage and recent experiments indicate its possible use as a herbicide.

Farmers shouldn't fail to try the new chemical weed killers but neither should they go all out for them. Remember that 2,4-D was first developed as a weapon of war. It was manufactured as a chemical that could be sprayed over enemy crop land to destroy the food supply of enemy countries. It has not yet been fully demilitarized and has the power to do a lot of damage when not used carefully. Take it easy. Employ the latest findings of your state experiment station. Don't overdose and remember that local conditions control the results. The future of chemical weed killers is bright but the present is filled with questions.

..FOX FORAGE HARVESTER 12 SUCCESSFUL YEARS and...

..... still going strong

FOX Forage Harvester is now in its twelfth successful year of field proven performance. Years ago the FOX stepped out of the experimental stage and has delivered to farmers the nation's most successful, trouble free service.

The Fox Forage Harvester is equally efficient in corn, cudzo, grass silage, dry hay and straw. Simple of operation and easily changed for use with the different crops, the Fox is the outstanding forage harvester of today.

All during the war years the farmers placed their confidence in the Fox and were not disappointed.

The Fox Forage Harvester has 3 interchangeable harvesting units, the pick-up, the corn silage unit and the mower bar for grass silage.

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R. Eckstrom Secretary

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- You can mow, chop and load, in one operation, over 200 tons of grass silage a day.
- You can cut corn of any height, chop it into silage and load into wagons ready for the silo, all in one operation.
- One man can pick up, chop and load, ready for the mow or stack, 2 tons of dry hay in 12 minutes.

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THE NEW Auto-Lite Transport Spark Plug is built especially for the toughest kind of truck and tractor operation. Helps you get best performance, longer plug life. America's leading truck and tractor manufacturers have approved this patented Auto-Lite Transport Spark Plug for the most severe types of service. Your Auto-Lite dealer can supply you with this better farm plug. See him today.

THE ELECTRIC AUTO-LITE COMPANY

Sarnia, Ontario — Toledo 1, Ohio

LIME

(Continued from page 87)

its use. The pH reading appears on a dial.

The failure to bring many soils back to good fertility may be caused by the lack of some other plant food which liming indirectly causes. Lime helps legumes; legumes produce nitrogen, which grows a bigger corn crop, which takes a heavier toll of plant food minerals. These are frequently not supplied in sufficient amounts and following crops are poor. Acidity tests should be made under both wet and dry conditions of the soil, to make sure that the pH remains within the proper range for soil fertility under all conditions while the crop is in the ground. A complete soil test should be made in conjunction with the pH test to gain a complete picture of soil condition.

Seasonal Quirks of Acidity

In some soils, especially those containing finely divided particles densely packed, there may be seasonal variations in tests for acidity. Each fine soil particle may be surrounded by an envelope of organic matter containing acids which are not detected by tests made by simple water extraction. On such soils tests may show a pH of 6.4 to 6.5 under ordinary conditions, but after a prolonged wet spell will drop to pH 5.0. When the soil dries out the pH will return to pH 6.4 or 6.5 again. Under these conditions beneficial bacteria are killed out by every wet spell. Clovers can be grown for one season only.

How and When

Lime gives the best results when it is mixed with the first three or four inches of topsoil. Good results come when it is spread on plowed ground and then disced in. However, any time is liming time. Put it on, don't put it off. It can be spread on alfalfa, clover, and winter grain during the winter. Since the results of one application are distributed over a period of years, it matters little what season it is spread. The job can be done in the off season or on a rainy day.

Lime can be spread either by hand, by machines made especially for the purpose, or drilled in at the same time a grain is planted. The hand method is not advised for large acreage. Many excellent lime spreaders are on the market and in many places the dealer has specially constructed trucks with spreader attachment; lime is delivered and spread at so much per acre.

Qualities, Prices and Analysis

When buying lime, the farmer should (1) assure himself the grind is proper; (2) assure himself of the analysis; (3) assure himself of his need for lime.

When buying agricultural liming material a farmer should be as much concerned about its analysis, grind, and water content as he is about the quality of his fertilizer. No farmer should buy fertilizer without close inspection of the formula on the bag. Few farmers take this precaution when buying lime and will invest their money in almost anything called "Agricultural Lime" even though it may be so loaded with silica or other impurities as to make it practically useless.

All grades of lime look about alike, which makes a sucker of the careless farmer. Only a test tube analysis will indicate the true value.

Some agronomists say there is a lot of shenanigans going on in the lime business. In most states the AAA recommends or endorses the agricultural lime produced in the state. It reimburses the farmer if he applies the recommended lime. In some states, agronomists say, a lime producer with political know-how can obtain endorsement for a poor product. Agronomists have not always agreed with the AAA in the qualities of agricultural lime endorsed. If such conditions exist the farmer finds himself in the middle. Most states have defined the grades and grinds of lime. Their standards vary, depending on whether the regulations are written by the lime dealers or by the agronomists. While regulations governing the designation of the various grinds differ from state to state, in general the specifications group the coarseness of grind into classes.

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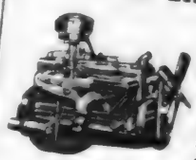

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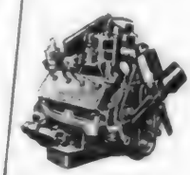

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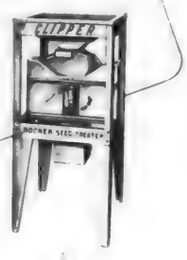

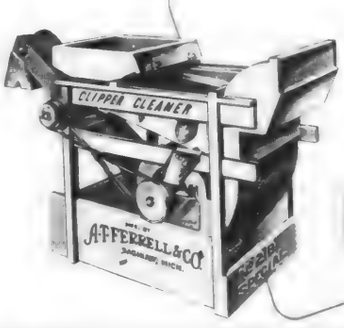

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1. Superfine: 75 to 100 percent passing through 100-mesh screen.
2. Pulverized: 55 to 75 percent passing through 100-mesh screen.
3. Agricultural ground: 40 to 55 percent passing through 100-mesh screen.
4. Meal: 25 to 40 percent passing through 100-mesh screen.
5. Screenings: 10 to 25 percent passing through 100-mesh screen. Very often a roadstone by-product.

Some manufacturers of agricultural lime guarantee that 85% of their product will product will pass through a 200 mesh screen. Some agronomists say this is a waste of time and money in grinding and adds to the cost without increasing its value as a liming material.

Agricultural lime may be pure limestone: that is, calcium carbonate, or calcium oxide (quick lime) or hydrated lime (slaked lime) or it may contain other ingredients found in the natural rock from which it was ground. These may be magnesium, silica or iron and traces of other elements and compounds. When there is a high percentage of magnesium carbonate with the calcium carbonate it is known as dolomite. Since magnesium carbonate has a higher neutralizing value than calcium carbonate, dolomite is a very excellent agricultural lime. The fact that magnesium is, in addition to being a neutralizing element, a plant food needed in as great amount as calcium and is used by the plant in the formation of chlorophyll, makes dolomite not only a good soil sweetener but also a fertilizer. One of the richest dolomite formations in the world is found in northern Indiana and northwestern Ohio. The analysis is 54% calcium carbonate and 45% magnesium carbonate. Farmers need to watch their crops for magnesium starvation and when this occurs they can afford to pay the extra price for dolomite. Other materials sold as agricultural lime are forms of slag, sugar defining lime, and marl.

Agricultural limes are also graded according to their neutralizing power. A 100% pure calcium carbonate is the yardstick by which the neutralizing power of agricultural lime is measured. This is said to have a neutralizing power of 100. Dolomite, because of the magnesium present, may have a neutralizing power of as high as 108. Some agricultural limes grade as low as 73 to 75. Hydrated lime has a neutralizing power of 144 but is expensive; 1,500 lbs. equals 2,000 lbs. of ground limestone in neutralizing power. Quick lime is also expensive; 1,120 lbs. equals 2,000 lbs. of ground limestone. It is too caustic for general use.

The moisture content of agricultural lime is also important, for you may be buying a lot of water and paying lime prices for it. Bag lime is practically moisture free because it is kiln dried before it is bagged. Bulk lime may contain as much as 15 to 20% water.

The superfine grades of lime and dolomite of a high neutralizing value are almost immediately available to crops.

The coarser the grind the less available and it may take some of the coarser grinds several years to produce effect. This is generally regarded as an advantage. Some soil experts say the coarse grades have an accumulative effect up to seven and ten years. The very coarse grinds of screenings, containing particles as big as the end of your thumb, will probably not disintegrate within the lifetime of the farmer and are practically worthless as soil neutralizers.

Some agricultural limes can be bought as cheaply as $1.70 per ton at the plant. A good dolomite now on the market sells for $5.50 at the plant. Calcitic pulverized

(Continued on page 142)

SAMPLERS

(Continued from page 43)

The girls ranged in age from little Polly Fuller, who, at four years old, produced a sampler with two alphabets, her name, and the date, to girls in their teens doing much more elaborate work. Mary Smith, who was just five, turned out a very workmanlike job with the usual two alphabets and the inscription, "Mary Smith is my name and with my nedel I wroght the same." She became a bit confused, however, when she came to the date for she has carefully stitched it as being 17014. The older girls showed greater proficiency with their needles and usually embellished their work more elaborately with needlework pictures and verse. Occasionally the school influence becomes overwhelmingly apparent when a sampler with the usual alphabets is decorated by stitching on the multiplication tables. Another pedantic theme that was occasionally used was the map of the state in which the sampler was made. One such map-sampler made by Elizabeth Ann Goldin in 1829, gives, in addition to the map of the State of New York, the population of the State, the length and breadth of Long Island, and a brief reference to two victories of the Americans over the British.

These great-great-great-grandmothers of our bobby-soxers left little record of any of the giddyness that we generally associate with their descendants. It is impossible to imagine the lass of the revolutionary period swooning over a recording but we do know that they sighed for love. Their sighs are sometimes recorded on their samplers in the form of love verse. One little girl worked onto her sampler, in language that the bobby-soxer would never use but with a sentiment she would understand.

"Oh let my name engraven stand
"Both on thy heart and on thy hand
"Seat me upon thine arm and wear
"That pledge of love forever there."

The needlework pictures, used to adorn the samplers, covered every conceivable subject from portraits, contemporary buildings, and pastoral scenes to Adam and Eve. The latter were usually modestly

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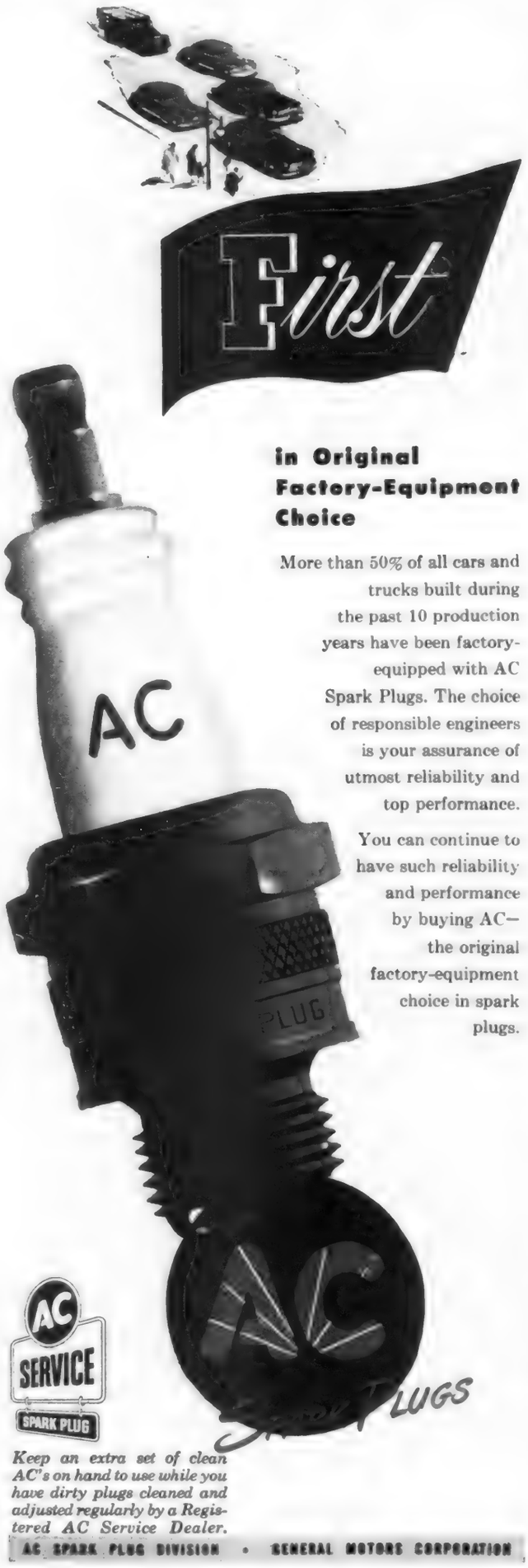
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hidden behind enormous fig leaves and one prudish little girl even clothed this shame-free couple in Quaker costumes with Cain and Abel neatly stitched into knee breeches.

The verse that the girls chose ran heavily to piety and goodness in praise of parents, praise of beauty and nature, and verse mourning the loss of kinfolk. One lugubrious girl, Betsy Cook, dwelling on her own death, wrote, "This work in hand my friends may have, when I am dead and laid in grave." And, under a willow tree, depicted a tomb marked "Miss B. C." In all this welter of goodness and piety one inscription stands out for its vigour and honesty. It reads, "Patty Polk did this and she hated every stitch she did in it. She loves to read much more."

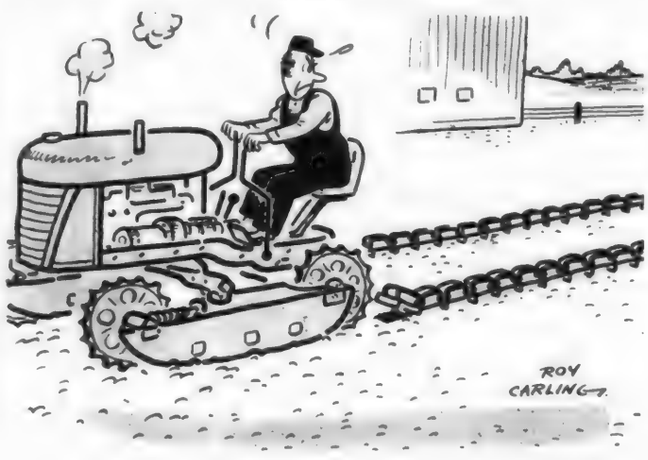
During the last part of the eighteenth century and the first of the nineteenth the sampler makers began to include geneological data on their work. Usually the names of the parents with their birth dates were recorded followed by the names and dates of all their children. The date of the death of any member of the family was stitched in later. Some samplers carry back to include the grandparents. Geneologists have found these samplers to be almost as useful as the old family Bible for tracing the family tree.

There are almost as many samplers associated with George Washington as there are beds in which he is alleged to have slept. Some of these were owned by families who entertained Washington and are said to have been admired by him. And what is more natural than that the great man visiting his friends should compliment the family on the excellence of the wife's needlework. Other Washington samplers carry verse celebrating his leadership and there are many that mourn his death such as the one produced in 1804:

"Mourn Hapless Brethren Deeply Mourn
"The Source Of Every Joy Is Fled
"Our Father Dear The Friend Of Man
"The Godlike Washington Is Dead."

Since the Civil War the making of samplers has gradually died out though a few still appear now and then in the needlework section at the county fairs. Collectors, decorators, and museums have taken up the sampler and there is a fairly brisk trade in them. Some of these collectors specialize in particular kinds of samplers such as the all white samplers or those of a particular period. The prices paid for samplers are not, however, in the same class with rare books, old violins, or grand champion bulls, so if you should find an authentic old sampler in your attic do not expect it to pay off the mortgage; you will probably find that its greatest value is in your own home as a decoration.

In the sewing classes of our schools the modern girl studying Home Economics has available books, illustrations, and patterns as sewing aids. Usually she makes her own loose leaf scrap book in which she pastes cloth with trial stitches along with descriptions and drawings of her new stitches. She would probably not call this a sampler but it serves the same purpose as the early ensemplers of Chaucer's time, a place to record stitches for future reference.



CHOLERA

(Continued from page 40)

from finely ground glandular tissues that have been removed from the bodies of pigs that were in the acute stages of cholera. These tissues carry the virus of the disease. When they are treated with oil of eucalyptus the virus is reduced in potency to the point where its disease producing properties are lost, but its immunizing properties retained.

Like the other methods of immunization there are advantages and disadvantages to these products which should be recognized. First, let's consider the advantages: One is the fact that there are no actual live cholera virus involved. This being true there cannot possibly be any breaks due to insufficient serum dosages or impotent virus.

When pigs that are carrying latent infections are vaccinated with the Double Treatment there is a chance for these troubles to be aggravated. This difficulty is not encountered with Crystal Violet or B.T.V.

These biologicals have the ability to withstand variable temperature conditions, thus being more likely to maintain their potency than the serum-virus biologicals under similar conditions.

As previously mentioned, when older pigs are given the Double Treatment they should be held off feed for a while, which, of course, cuts down gains. When vaccinating with Crystal Violet or B.T.V. it is not necessary to cut down on feed.

Another advantage claimed for Crystal Violet and B.T.V., which is probably most significant of all, is that they eliminated bringing live cholera virus to the farm.

On the reverse side of the chart, there is the decided disadvantage of time required for immunity to develop after inoculation with either of these products. This period of about three weeks is certainly a menace when cholera is present in the neighborhood.

A second, and very serious objection, is that the immunity developed by either of these methods is not as lasting as that developed by the Double Treatment method. The immunity developed by Crystal Violet or B.T.V. cannot be counted upon to last much longer than eight months. Therefore, young hogs kept for breeding purposes must be re-vaccinated eight months later and about every year thereafter. It is around this point that some controversy centers. Some say that because of the necessity for periodic treatment, breaks occur with this system of immunization. However, it is usually found that the reason these so-called breaks occur is that the farmer fails to get his pigs re-vaccinated before the old vaccination runs out. His pigs, having lost their immunity, are as susceptible to cholera as any unvaccinated hogs. The short lived immunity of Crystal Violet and B.T.V. places the burden upon the hog owner of remembering when it is time to re-vaccinate.

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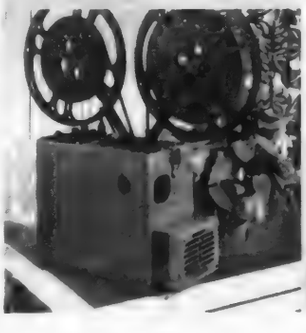

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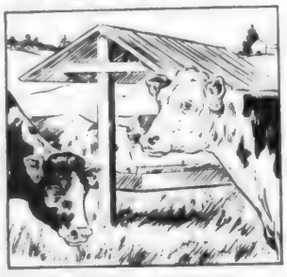

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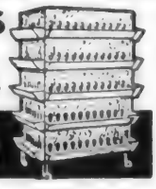

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It is recommended that pigs be vaccinated with Crystal Violet or B.T.V. about two weeks after weaning. This too has its disadvantages because the pigs could contract cholera before this age and also they are harder to handle than at six weeks of age.

The Crystal Violet vaccine and B.T.V. have not as yet had wide enough usage to be generally accepted.

Combination Treatment

The fifth method, the Combination Treatment for cholera immunization, is a combination of two of the others, B.T.V. and serum. The Combination Treatment is advisable under some conditions and does help answer some of the criticisms of B.T.V. alone and also the Double Treatment.

Serum-B.T.V. treatment has one very obvious advantage, which is the giving of immediate protection. B.T.V. alone does not give protection for about three weeks whereas the serum produces immediate immunity to carry the pigs along until the B.T.V. has time to work. The disadvantage of short time immunity does not apply to this method as it does to B.T.V. alone.

The five possible ways of protecting hogs against cholera have been presented. (1) Serum-Virus treatment; (2) Serum treatment alone; (3) Crystal Violet treatment; (4) B.T.V. treatment, and (5) Serum-B.T.V. treatment. Each procedure has advantages and disadvantages. The hog raiser can take his choice, based on his own set of conditions. However, to help him make up his mind he should call upon the services of his veterinarian, a man schooled and skilled in just such problems. The vet is in a sound position to give advice regarding the advisability of this method or that; he is in a position to see the farmer's pigs and know their background. This will help him determine which method to advise his client to use. Finally after the decision is made he is the logical man to secure the biologicals and administer them correctly.

Cholera—Incubation and Symptoms

So much for cholera treatment. Now let's take a look at the disease itself, it's symptoms and the way it operates. Because the exact time of exposure is seldom known, the initial symptoms of the disease are not usually noticed by the farmer. The virus may have been working on his hogs for days before noticeable symptoms appear. In the laboratory, animals experimentally infected with the disease usually show symptoms in 3 to 5 days; on the farm it is likely that symptoms do not show up for a few days longer.

The very first symptom of hog cholera is an increase in bodily temperature. This is seldom if ever noticed by the farmer, who usually has more to do than to take the daily temperature of his hogs. The normal temperature of a hog is about 102 degrees and this may rise to 105 or 108 degrees in the course of the disease. This

increase in temperature may precede the outward symptoms which a farmer will notice, by a day or so. One of the first signs of trouble which is readily seen is the failure of the hog to eat. There is nothing that is more musical to a farmer's ears than the day and night clanging of the self feeder lids as his fattening hogs keep busy on the groceries. They tell a story of an old hog man who became aware, in his sleep, that the feeder lids had stopped clanging. Without even seeing his hogs he got up and called the vet. The next morning when the vet arrived there were unmistakable signs of sick hogs. Of course, it was too late to do much for the herd and many of the best hogs were lost.

Sick animals tend to keep to themselves. They hide in dark corners and even burrow under the bedding. If forced to get up the hog will do so with reluctance and, after sluggishly moving a short distance, may stand with back arched, head down, flanks tucked up and tail hanging. Sometimes the eyes show a sticky discharge which tends to glue them shut. As the temperature goes up an intense thirst may develop.

At first the sick hogs may develop a constipated condition, but this is of short duration and is followed by severe diarrhea. Hogs that are able to live a while soon show marked signs of weight loss. One of the most characteristic symptoms found in advanced stages of cholera is the presence of red or purple blotching on the skin of the underline around the belly.

As the disease progresses the animals lose their ability to walk normally. They become weak, wobbly, and get staggery, especially in the hind quarters, finally buckling and falling over, usually dying in a convulsion. The duration of the disease in its most acute form is about 7 days. In the less acute forms the hogs may linger for 2, 3 or more weeks. Mortality is especially high in herds where there has been no cholera for a long time, since there has been no natural immunity built up.

The symptoms of hog cholera are extremely variable. It is highly unlikely that any one hog will show all of the symptoms, yet in an infected herd most of them can be found. Unfortunately, many of the symptoms of cholera are also characteristic of a number of other hog diseases such as erysepalis, flu and necrotic enteritis. This situation makes the diagnosis of cholera a very difficult task and certainly one for a competent veterinarian.

There is no known satisfactory cure for hog cholera. All of the emphasis is placed upon prevention, which is a sure thing when properly handled.

Cholera Sneaks In

Hog cholera germs really get around, sometimes in what seems to be a rather mysterious sort of way, but in every case a logical explanation for the infection can be found. An important source of the infection is the cholera infected animal itself. It has been found that hogs are potential sources of infection even during the incubation period of the disease. Apparently healthy hogs are often brought into herds from the outside and later come down with the disease and infect the healthy herd.

It is commonly believed that pigeons may spread the disease, but recent tests show that they have probably been falsely accused. Careful experiments were conducted in which pigs were exposed to contact with pigeons which were passing back and forth between healthy hogs and a pen of cholera infected animals. The healthy hogs did not contract the disease. There is, however, considerable chance for crows and buzzards to spread cholera since they feed on carrion and could easily drop portions of cholera infected flesh while flying about from place to place.

Insects play an important role in the spread of cholera germs. Many insects were suspected, but the finger of guilt points most often to the housefly and the stablefly. Since a housefly can travel as far as 12 miles in two days, this may explain the sudden appearance of cholera in an area where there has been no infection for some time.

The carcasses of cholera victims should be disposed of quickly and thoroughly for they are infested with the virus in its most virulent form. Carcasses should be buried deeply and covered with quicklime or taken away promptly by a rendering plant truck.

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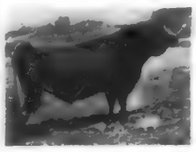

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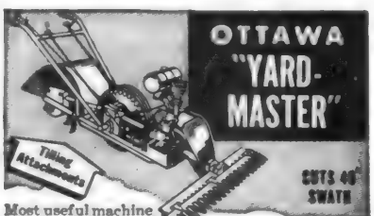

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Isolated cholera germs will live varying lengths of time, depending upon conditions. In Iowa it was found that the germs lived all winter in the bodies of hogs buried in the fall. Where the bodies of the hogs were allowed to lay unburied, the germs were found to be infective for as long as 11 weeks. In warm weather the germs live a much shorter time. The bodies of dead hogs soon start to putrify and this destroys the virus rapidly. Sunlight is a potent killer of these germs and infected pens may clear up in as short a time as 24 hours where strong summer sun can hit them directly. The same pens may retain their evil possibilities for a month or longer in the winter.

Pens, crates and trucks that have carried sick animals are sources of infection unless they are properly cleaned and sterilized.

Streams which flow through lots where hogs have cholera are possible carriers of the disease for short distances. The germs may be carried from farm to farm by dogs or foxes. Then, of course, there is always the chance of a farmer himself passing the disease along on his shoes or the wheels of his wagon or truck.

And under no circumstances buy hogs which have not been vaccinated. One point is clear when cholera breaks out in a herd, the germs have gotten there by some carrier; cholera doesn't come from the air. It is caused by *living cholera germs,* which came in by natural, not supernatural, means.

The Cholera Virus

The virus of hog cholera is as yet invisible to the eye. It cannot be seen with even the most powerful of microscopes and it will pass through the pores of filters that will hold back all visible bacteria. It is called an ultramicroscopic filterable virus.

The virus gets inside the body of the hog by way of the digestive tract. In other words he eats it. The germs may be on contaminated feed, in his drinking water, or on anything that the pig swallows, or gets into his mouth.

The following table lists the estimated number of hog deaths due to cholera per 1000 hogs in the U. S. from 1884-1940.

1884	85	1914	80
1886	130	1916	42
1888	80	1918	41
1890	75	1920	40
1892	58	1922	40
1894	50	1924	30
1896	130	1926	60
1898	75	1928	30
1900	65	1930	27
1902	53	1932	27
1904	48	1934	28
1906	42	1936	24
1908	48	1938	30
1910	40	1940	30
1912	100		

Costs of Immunization

The cost of anything is always interesting to the farmer. The cost of immunization is sure to vary from area to area and also with general economic conditions. However, the following charges are current today in one cornbelt community: Pigs weighing from 25 lbs. to 50 lbs. cost an average of 90c per pig where the Double Treatment is used. Pigs weighing from 75 lbs. to 100 lbs. cost an average of $1.25 where the Double Treatment is used. When the pigs are vaccinated

with B.T.V. or Crystal Violet there is a flat charge of $1.00 because the same dosage is given regardless of the size of the pig. This may be somewhat of a disadvantage on small pigs, but is a decided advantage where larger animals are immunized.

These prices are averages, coming from only one area. The condition of the pigs can cause this to vary some, and of course different practitioners may have different charges. A horse sense way to get facts on the costs of immunization is to get the information from the veterinarian is to get the information from the veterinarian who will be doing the work.

For Hogs Only

Hog cholera virus does not attack any other animal or bird. All hogs, unless immunized, are susceptible to the disease regardless of age or breed. It is possible that younger animals are somewhat more susceptible than older, stronger animals.

Marketing Angles

When a farmer discovers cholera in his herd he may be tempted to rush them off to market to beat the sure mortality. If hogs are well enough along in the development of the disease so that the government meat inspectors can detect its presence by the appearance of lesions the carcasses are condemned. Of course, a farmer might butcher one of his own sick hogs and then use the meat for home consumption; however, meat inspectors say they cannot recommend such a practice. As previously pointed out, the hog cholera germ infects only hogs, but the eating of meat from a hog that has been seriously sick from any ailment isn't good to think about.

Just Among Us Farmers

There is a very common superstition among cornbelt hog raisers that too heavy consumption of green or soft corn in the fall will cause hogs to get cholera. Also there are some who believe that lack of minerals will cause the same trouble. Of course, these are purely pipe dreams as cholera is caused by one and only one thing, the living cholera germ. Should lack of minerals, the feeding of green corn, feeding soft corn or any other feeding or management practice be followed to the extent that it lowers a hog's resistance, then this hog might get cholera quicker than one whose bodily defenses were up to par. This is the only possible way these factors could enter into the cholera picture.

Inasmuch as the natural seasonal variation in the incidence of cholera reaches its peak during the months of August, September and October, this explains the belief that the feeding of green or soft corn is connected with the disease.

A remedy that is supposed to be a sure cure for cholera and many other livestock diseases is a mixture of coaloil, copperas and quinine. This concoction appears potent enough to kill most any germ but it won't phase the cholera germ. He's a tough hombre.

Hog cholera is the most prevalent disease among hogs and kills more than all of the other hog diseases combined. How extensive the disease is in any one season depends upon two things: (1) the movement of hogs and also (2) the density of the hog population. It has been reported by the Bureau of Animal Industry that losses to the swine industry from cholera averages $20 million a year in the United States and may go as high as $65 million in peak years.

In 1896 more than 13% of the swine in this country were killed by cholera. In 1913 more than 10% of them were killed.

Hog cholera occurs in every state in the U. S. and practically everywhere in the world where hogs are raised. In Canada and Australia mortality is low in proportion to the number of hogs raised. Why this is so is not clearly understood but is probably due to the sparsity of population. If you want to raise hogs without worrying about the different kinds of cholera vaccines these places might be better. But most farmers will stick where they can raise corn, and pay the costs of immunization.

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THIS farm has already been striken with poverty. Practically all the top soil is gone—worn away by erosion.

Years ago, the rich fertile top soil on American farms averaged nine inches in depth. Today, the average is only six inches—one third of the soil has already been lost through over-cropping and poor land management.

Fortunately, most of these losses of top soil can now be stopped through proper soil conservation methods. Steeper slopes should be kept in trees, improved pasture, or good quality hay. On cultivated fields, erosion should be first reduced through the use of lime and legumes to obtain good sods; maintenance of high fertility levels; following good crop rotations and the liberal use of manure, cover crops and sod waterways.

On most sloping farms, however, the addition of contour strip farming is needed to protect the land from the ravages of sheet erosion and the growth of gullies.

By re-locating your fences, so that you can plow on the contour and keep livestock out of woodlots and away from sections to be reclaimed, you can take the first step toward soil conservation.

If you need fence or other wire products, place your order with the nearest U·S·S American Fence dealer now. He may be able to supply you from stock. For more information or the address of a dealer near you, write to American Fence, Room 408, Rockefeller Building, Cleveland 13, Ohio.

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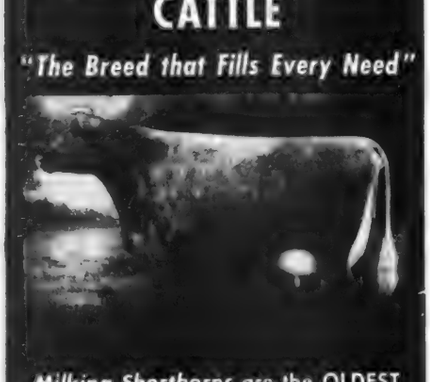

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THE WHITEFACE

(Continued from page 37)

the top line at which the hide is attached firmly to the back. When the hide is pushed outward from the back by fat, as finish is acquired, these spots become depressions and detract from a smooth appearance, but nothing more. Occasionally an excessive amount of loose hide in the region of the throat and dewlap is encountered. This is known as "excess leather" and is objectionable in show animals. Similarly high tail-heads and crooked hind legs are to be avoided.

Despite their intense loyalty to the breed, veteran Hereford breeders recognize that their breed is not perfect and are constantly working for its improvement. "After all," the breeders say, "we've got to keep them useful to the commercial producer because he is the fellow who produces beef, the end result of all our work and the biggest item in the food budget of the American housewife."

The Small Breeder

Robert Cutter, of Dillsboro, Indiana, fell in love with Herefords when he worked as a herdsman on a large farm before the first World War. When he got out of the army in 1918 Cutter went back to the rolling hills of Indiana and made his start as an independent Hereford breeder. With his son Gilbert he now runs a herd of 32 cows and a registered bull, Blanchard Mixer, which is the family's pride and joy. "We bought Blanchard four years ago," Gilbert Cutter said, scratching the huge bull's poll, "and you should have heard the neighbors. When we bought our first bull for $175.00 they thought we were crazy but when we paid $500 for Blanchard as a yearling they were sure we were ready for the asylum. Well, we sold our first bull for twice what we paid for him and Blanchard has paid for himself many times over."

The Cutters raise mostly registered Herefords but they have a few good grade cows in the herd and also pasture three grade Jerseys with their beef animals. The breeding stock is kept on pasture during the summer and fed hay and silage during the winter. The only animals that are fed grain are those that are being prepared for show or sale. Then they get a mixture of oats and corn with a linseed protein supplement. Gilbert Cutter shows the best of the calf crop at the County and State Fairs and usually finds that the show ring is a good market place.

"We aren't too much interested in building up our dairy herd so we breed our three milk cows to Blanchard too. Blanchard really makes those calves look like beef animals," Cutter said. "We let them nurse for six to eight weeks and then sell them for vealers and we've topped the market every time by a cent to a cent and a half.

"We started with Herefords and have stayed with them because they are just natural rustlers and they can get fat off our hills," said Cutter.

Looking out to the pasture where a yearling bull had been worrying a sappling, Gilbert Cutter said, in about the tone a father might use when forced to reprimand his son for beating up the town bully, "If you think that little bull is strong you aught to see old Blanchard wind up a tree twice that size. It's fun for him but it's no way to keep a forest growing."

The Horatio Alger of Herefordom

In Fayette County, the "Herefordshire of Ohio," Sam Marting made his start back in 1932 when he was 17 years old. Marting and his young wife started married life on a farm, rented from his grandfather, with assets of $365.00, a worn-out tractor, and a Hereford cow which his uncle, Dr. W. F. Marting had taken as payment on a doctor bill. Marting did well for the depression years and, in 1936, he was able to go to the Denver Show and buy a nine month old bull, Real Prince 85th, for $1,125.00. It was the second highest priced bull sold in the show and would be the equivalent of a $10,000 to $15,000 bull today. The purchase of this bull marked the real start of the breeding herd and it wasn't long until Marting made his bull pay off, for he had some of the best Hereford blood in the country. Three years after his purchase Real Prince sired a bull calf that

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sold for $12,000 to Edward Stettinius, one-time president of U. S. Steel Company.

The system Marting used was to sell bulls and buy more heifers to enlarge his herd. He was young, shrewd, and aggressive and he put no limit on the amount of time he was willing to give his cattle. If he had a sick animal he stayed with her until he had her on her feet. He always kept one or two extra bulls that he thought had good possibilities in addition to his top herd sire. In this way he was never caught without a good bull. Running 250 breeding animals he has been able to sell every animal from his calf crop before it is a year old.

On June 7, 1948, Marting and his grandfather dissolved their Bea-Mar partnership in a sale at the farm. The prices they received for all of their animals averaged $1,092.42. Perhaps Real Prince was not such an extravagance after all.

Marting has had his bad luck along with the good during this period. After showing at the 1941 International he returned home with a lot of calves sick with shipping fever. Before he had a healthy herd again he had lost 51 animals and was almost out of business. On another occasion he lost nine valuable cows when some baling wire got chopped up with the silage. These were tough breaks but he weathered them and now owns the original 500 acre farm he rented in 1932 and several hundred additional acres around him.

Marting's pasture, hay, silage, and supplement are almost entirely home grown. His use of corn and cob meal is discussed in "Feeding Corn Cobs" in this issue.

The Big Breeders

Cornbelt farmers often find it profitable to keep as few as a dozen good commercial cows from which the calves are finished and sold as a part of each year's business. On the other hand, big outfits like the Matador, the SMS, the JA, the Four 6's and others count their cows by thousands, and the calf branding outfits that go out in the spring equipped to stay until the job is finished often don't return until fall.

One of the largest outfits devoted exclusively to purebred production is the 57,000 acre Wyoming Hereford Ranch at Cheyenne, Wyoming. Here some 1,000 registered Hereford cows, under the management of Robert W. Lazear and his associates, produce seed stock for other purebred herds, and range bulls for commercial outfits. The ranch annually fits a full show herd for exhibition at major livestock shows. The annual sale held in October attracts cattlemen from thirty or more states and Canada, and their 1947 sale made an all-time record for a beef cattle auction. The Wyoming Hereford Ranch, "WHR," as it is known, is an institution in itself. The ranch has a special office force, its own telephone system, fire department, dairy for the employees' milk supply, veterinarian and his laboratory equipment, special display

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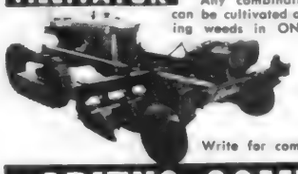

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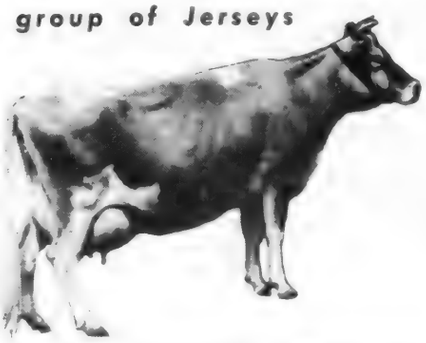

Typical of the importation of 92 head of Jerseys is MOLLY'S FILLPAIL MAID 1593086 — 7 year old — Island Butterfat Champion since the Island liberation. Record: 13,000 lbs. milk, 853 lbs. B. F. 334 days; now on test in 100 days has made approximately 5400 lbs. milk and 300 lbs. butterfat.

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pens for cattle offered for sale. Despite these special trappings that may startle the visitor at first glance, WHR is a practical outfit. Top calves are spotted and taken to the fitting barn for special attention, but the rest of the calves make it on grass and their mothers' milk. Grass, plus hay when the grass is snowed under, is the basic ration of the mother cows. Young cattle are given sufficient feed to promote maximum development, and cattle intended for sale are, of course, kept in merchantable condition. The annual auction sale of top cattle, the carload bulls which go to Denver for showing and sale, plus a tremendous private treaty demand at home, completes the marketing phase of the business.

At the 1945 National Western Stock Show at Denver, Lazaer is reported to have refused an offer of $100,000 for his outstanding bull, WHR Helmsman 3rd, with the classic remark, "I'm not certain just what I could do with $100,000, but I do know what I can do out on the ranch with that bull." He should know for he can point to more than a million dollars brought by calves sired by WHR's famous old Prince Domino.

Home on the Range

Fully 85 per cent of our market beef is produced without feed concentrates today. This fact is not so hard to realize when records such as those from the Bridwell Ranch in Texas are reported. In the fall of 1947, J. S. Bridwell shipped a trainload of 800 two-year-old steers which averaged 1,179 pounds direct from grass. Another big beef outfit, Chapman-Barnard, of Tulsa, Oklahoma, produce some 50 to 60 tons of beef a day from grass alone in the peak of the grazing season. The majority of the 30,000 steers which graze their 150,000 acre ranch are Herefords. Provide Herefords with ample grass, salt and water and they really go to town. In the packing plants, grass fed animals dress as high as 60 to 63 per cent.

Herefords in the Feedlots

The Herefords ability to produce top-priced beef is shown in their record at the market. In Chicago, in 1947, Herefords accounted for 86 per cent of the straight breed and 84 per cent of all shipments which sold at the daily top price in day to day trading. The comparative numbers of these market topping shipments as recorded by W. J. Morrissey, Chicago market analyst, are as follows:

Chicago Market Topping Shipments

Breed	1947 Number of Shipments
Herefords	243
Angus	38
Shorthorns	2
Mixed	7
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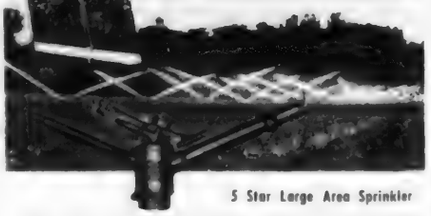

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The all-time record of $41.25 per hundredweight for fed steers at Chicago was made on January 6, 1948, by Herefords and this breed also holds the all-market top of $41.65 per hundredweight made at Sioux City, Iowa.

Herefords In Feeder Contests

The following summary shows how Herefords have dominated the interbreed feeder cattle contests for years:

Kansas City—32 grand championships out of 34 awards.

Denver—31 grand championships out of 39 awards.

Chicago—31 grand championships out of 47 awards and 13 "grands" out of the past 14 years.

Herefords hold the record price for a carload of feeder calves sold at auction. $60.00 per hundredweight.

An outstanding example of the Herefords performance on the feedlot is shown in the operations of the Jim River Ranch, Scotland, South Dakota. In 1946 the Jim River Ranch qualified seven loads of fat Herefords in the Big International Carlot Show, a feat never before accomplished by a ranch with cattle of its own breeding. Furthermore these steers weighed from 1,188 to 1,200 pounds at 17 and 18 months of age and had gained two pounds per head daily while on feed. In late 1946 and early 1947, this ranch sold a total of 645 fat steers at more than $30 per hundredweight, and every steer was of its own breeding.

The breed's marked tendency toward early maturity and its aptitude to fatten have made Herefords popular in creep-feeding on the same farm on which they were bred.

Herefords in the Show-Rings

For five out of the past six years, packer judges at Chicago's Fat Carlot Show have picked Herefords for the Grand Championship over all other breeds. Furthermore, one of these loads holds the all-time auction record price of $200 per hundredweight for a load of fat cattle. Other Grands for fat cattle in the bulk were captured in the past season by Herefords at Kansas City, Denver, Timonium, San Francisco, Ogden and Los Angeles with a single loss at Portland. At the Chicago Feeder Show Herefords won both the Grand and Reserve awards.

The Hereford story covers a long period of time and a great change in the breed. Benjamin Tomkins who saw prize winning Hereford steers at the Smithfield Fat Stock Show standing six feet, seven inches high and eight feet, eleven inches long, would be amazed to see the low-set, blocky Hereford of today which is the end result of his great effort to breed beef for the housewife who buys the roast.

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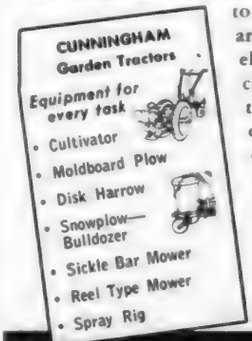

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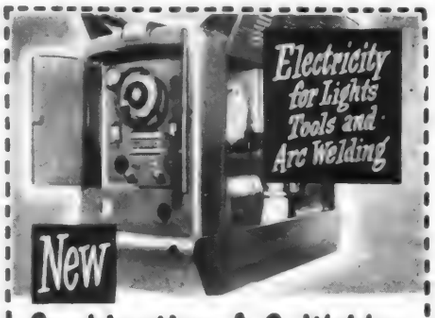

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LAZY MAN'S HENHOUSE

(Continued from page 73)

chickens build up immunity to the disease because they are exposed at an early age. This freedom from disease is also held partly responsible for better gains. Poultry fact finders at the New Jersey College of Agriculture point out that moisture content of litter is usually low when litter is built up, and that the concentration of infectious bacteria is probably diluted. Droppings mix with the litter and dry and crumble quickly, thus losing much of their danger.

The lack of cannibalism among chickens on deep litter is a matter of record, but here again there are only guesses for the reasons. Ohio research men suggest that chickens must get vital minerals and vitamins from the litter, the lack of which would make them attack each other. One Eastern expert offers the bland explanation that the birds may keep so busy searching for food in the litter that they don't get time to pick at each other.

The fact that hens on deep litter lay eggs of good hatchability has been shown at the Ohio Experiment Station to be tied up with minerals and vitamins available in the litter.

Some experts feel that deep litter contributes to the diet of chickens but others don't agree. The dissenters say that litter contributes only bulk. Ohio State chicken men claim that riboflavin and other vitamin complexes are built up in the litter and as proof point out that regardless of their feed, hens lay eggs of good hatchability on deep litter.

How To Use Deep Litter

Built-up litter in any type of chicken house starts with a layer, usually about three inches thick, of clean litter, either chopped straw, ground corn cobs, or shavings, depending on which is most available. With adult birds under average conditions, the litter will not become compacted for three or four weeks.

When poultrymen started to employ built-up litter practices they looked around for ways to keep it dry. Hydrated lime which has an affinity for water came in for its share of attention and soon became a regular helper in the chicken houses where litter was allowed to accumulate. Lime helped keep litter dry, and killed many of the odors that ordinarily permeated the houses. When the poultry raiser notices that the floor needs treatment he should add an inch of fresh litter with from 10 to 15 pounds of hydrated lime for each 100 square feet of floor space. The lime and fresh litter should be stirred into the old litter. The fresh litter helps absorb the moisture that has collected in the floor covering. The lime tends to break up the straw or other litter material and expose more surface area to which the condensed moisture can cling.

This treatment will probably have to

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be repeated every two to four weeks. In addition the litter may have to be stirred every two or three days to keep it from becoming compacted on top. After the built-up litter is four or five weeks old it seldom needs additional lime. Stirring and an occasional inch of fresh litter will keep it in shape.

The litter usually gets wet first around the watering devices. In this case the wet litter can be removed to a dry part of the house and dry litter shoveled into the spots around the fountains. This practice plus stirring, adding lime and adding an occasional layer of fresh litter will keep it usable for months. There has been little research done to determine the maximum length of time that litter can be used.

The first work with deep litter in chicken houses was done in New Jersey where scientists studied the value of lime in keeping litter dry and loose. Then the experiment station in the state of Washington conducted tests on the use of lime in litter for laying houses. Lime helped keep litter friable so that it absorbed more moisture and enabled the farmer to leave the litter in the hen house longer. The results from these experiments looked favorable to poultrymen across the nation. The experimental work shifted to Ohio when D. C. Kennard, a poultry specialist at the Wooster Experiment Station, studied the results from the other two stations and said to his co-workers. "This should have some applications in the brooder house."

In The Brooder House

To learn the place of deep litter in brooding chicks, Kennard planned an experiment at the Ohio station. The brooder house in Wooster has a capacity of 2000 chicks. At the beginning of the experiment the floor was covered with three or four inches of wood shavings. The house was filled with day old chicks and the stage was set for what turned out to be a fruitful test. "We watched the litter closely," said Kennard, "and when it started to get pasty on top and cake down we knew it needed something. Ordinarily we would have cleaned the house out at this point, but in this case we just added some fresh litter and mixed some lime through it. One inch of fresh litter is usually enough and in the early stages we always add lime."

This year Kennard is supervising the sixth brood of chicks on that same litter and the chicks are doing better than when the house was cleaned frequently. Early in his experiments he noticed that both coccidiosis and cannibalism went out when deep litter came in. "When we kept chicks on clean floors," he said, "we used to have serious trouble with coccidiosis. Now we have little if any and haven't been bothered with it since first starting to brood on deep litter. When the chicks are exposed to coccidiosis young, they build up immunity to it. Deep litter," he adds, "also cuts down cannibalism in the flock. We had one flock in which the birds were killing each other. We moved them onto old litter, and gradually the cannibalism faded out. Old litter has a nutritional value." The same litter can be left in a brooder house from eight to 16 weeks or even longer if it is in good condition.

Such practical poultrymen as Joe Schultz, of Mt. Washington, Ohio, Hatchery are sold on deep litter. Schultz says, "I've been raising chickens for 35 years and have seen them raised every way there is to raise them but have never seen nicer chickens that we raise on built up litter. I was up in Pennsylvania three years ago where the large producers of broilers were also using deep litter with good results. Most of the big producers are using deep litter. We're going to get rid of our batteries sooner or later because deep litter and floor raised chickens are easier to handle."

In The Breeding Flock

Hens housed on deep litter lay eggs of better hatchability than do hens kept in clean houses. Owners of breeding flocks have realized for many years that they had to feed their hens a ration complete in minerals and vitamins if they were to gather eggs high in hatchability. Now with deep litter they can get good hatchability on feeds low in these essentials. Chickens can glean the needed vitamins and minerals from the old litter.

To check the dietary needs of breeding flocks and the part that deep litter could play in supplying these needs, Kennard

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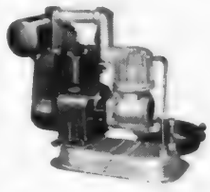

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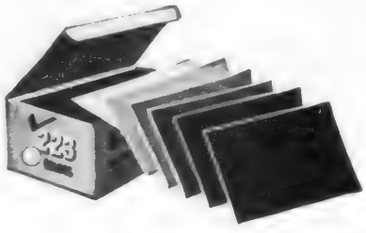

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first divided an experimental hen house into three sections.

The first section was allowed to build up deep litter with lime added, the second was cleaned every two weeks and the third has deep litter without lime. Each of these sections is divided into four pens large enough for 50 hens each.

The ration in each of the four pens in each section was varied in an effort to learn what the poultryman must add to the hen's diet when she is on deep litter and when she is in a clean house. The first pen in each section got a minimum basal ration of grain, bran, middlings, soybean meal, and minerals. The second pen of each section received the same ration with an additional five per cent alfalfa meal. The third pen had 2.5 per cent whey and the alfalfa and the fourth pen of each section was fed all of this, plus two percent mineral supplement. The hatchability of the eggs from each of the 12 pens was carefully checked.

With deep litter you clean annually.

In the clean pens the hatchability of the eggs was definitely controlled by the diet. On the feeds lacking the alfalfa meal, whey and mineral supplements, hatchability dropped as low as 33 percent, which is low in any poultryman's language. In the fourth pen of the clean section, where the birds ate a complete ration, hatchability jumped to 70 percent. This proved only that a complete ration is essential to hatchability, a fact which has been proved many times before. The interesting part of the story came from the four pens in the section where the floor was covered with built-up litter with lime added. The hatchability of eggs gathered from those pens remained at 70 to 75 percent regardless of the severe diet on which the hens were fed. The addition of mineral supplements to the diet added nothing to the hatchability. The hens gathered their mineral and vitamin requirements from the litter enriched with their own droppings. Included in the list of nutritional benefits from deep litter is one about which we know so little that it doesn't even have a name. It is called an unidentified animal pro-

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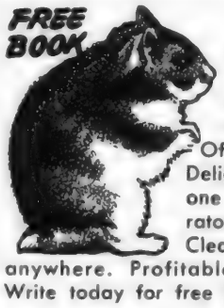

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tein or vitamin and is essential to good hatchability.

In broiler houses and laying houses where eggs are produced for food the primary advantage of deep litter is a saving in litter and labor.

The laying house or broiler house in which deep litter covers the floor is usually cleaned only in the spring when all the manure on the place is hauled to the fields. "Of course," points out Kennard, "you may have to take a layer off occasionally during the year to keep from hitting your head on the ceiling every time you enter the poultry house." No experimental work has been done on the value of deep litter as manure but the guesses are that it ranks high because of the lime and chicken droppings.

Some of the larger commercial poultry raisers in the East have garden tractors and cultivators for the job of stirring the litter. They follow the tractor back and forth across the houses pushing waves of hens in front of them until the whole floor covering is stirred and thoroughly mixed. With proper care they can keep adult chickens on the same litter for a year or longer.

Another advantage of from three to twelve inches of litter is the insulation provided during the winter months.

The litter in a chicken house is a world unto itself. The mixture of manure and bedding houses millions of bacterial and chemical reactions. Riboflavin, biotin, and other essentials are built during these reactions and the deep litter speeds up the action. The abundance of animal matter in deep litter probably accounts for the lack of cannibalism.

Regardless of the good results obtained to date with deep litter most poultry men realize that it is still possible to get coccidiosis in young chickens deep litter or no deep litter. Usually a treatment of sulfa in the water or feed will arrest the disease.

If we round up the results of the work done to date on the effect of deep litter in the poultry business the facts are as follows. Young chicks on deep litter can obtain much of their nutritional requirements for rapid growth directly from the litter. Built-up litter is a weapon against disease in the brooder house. Breeding hens lay eggs of good hatchability on low mineral and vitamin content feeds if they are housed on deep litter. Deep litter does not effect the production of laying flocks. Litter is in good condition as long as it's dry and it can be kept dry by stirring, adding lime an fresh litter. A layer of litter on the hen house floor is good insulation against severe temperatures. Last but perhaps foremost, deep litter saves labor.

Although there are now many things that we know about the use of deep litter there is much more that we don't know. Do chickens on deep litter require less minerals in their food? Will we in the future purposely expose all our baby chicks to coccidiosis when they are a day old and reap bigger profits?

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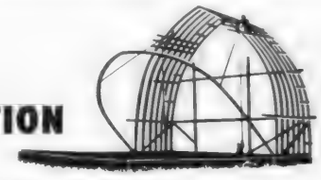
from FOUNDATION  **to RIDGE**

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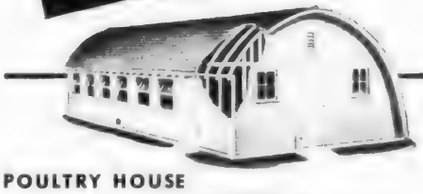

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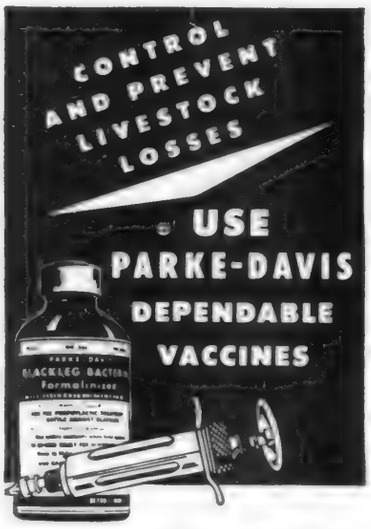

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WEATHER

(Continued from page 95)

tural centers of Chicago, Detroit, Boston and New York. Dr. William F. Peterson, meteorobiologist of Chicago, and research worker at St. Luke's Hospital and the University of Illinois, says that people of the "storm path" are weather-stimulated, by the 200 average weather changes they go through in a year. Having survived years of difficult living conditions they are more bustling than their relaxed, southern friends who live in a tranquil, stable climate.

Despite Mark Twain's quip, the farmer can do something about the weather. First, he can get acquainted with his nearest Weather Bureau station. There is no way a farmer can spend an hour more profitably than in talking to one of the men there. Find out what services are available, when the official radio weather forecasts are made locally. Study a weather chart and ask the weather man what peculiarities your local weather has, what directions your summer and winter storms come from. Look over the literature that is available. If the daily weather chart interests you, subscribe for a month; it costs 30c from the Government Printing Office, Washington, 25, D. C.

In planning rotations the smart thing to do is to talk to the county agent about seed varieties adapted to local conditions. For example, lespedeza, the legume that makes hay and pasture on lime-deficient soil, is very sensitive to climate. The length of day as determined by latitude also affects the adaptation of varieties of lespedeza. Common lespedeza grows best in the warm climates, while Korean lespedeza will grow in cooler climates.

If you live near New York City you can visit the Hayden Planetarium and see the weather exhibit which was built by the Aerology laboratory. In the exhibit are graphic models of the weather types we see most often. The cold and warm fronts are made into three dimensional models which show how weather moves across the country.

With this information and using the latest radio forecasts a farmer can be far better informed than in relying entirely on news broadcasts or newspaper forecasts. Second, use the reliable weather proverbs as a supplement to your barometer readings. The barometer's movement used with wind directions gives a good local weather guide for the next 12 to 24 hours. Third, for your short range forecasting, for 2 to 12 hours, study the sky to the west of you. The clouds are your short range weather indicators, and they often can tell you what the day will bring in the way of weather. Using the variety of tools available, the farmer can make a good batting average forecasting his own weather. If you do strike out once in a while you'll know how the weatherman feels. He has that trouble too!

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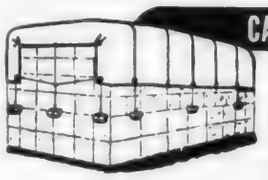

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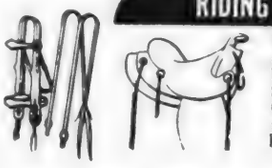

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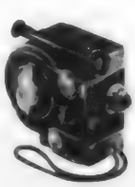

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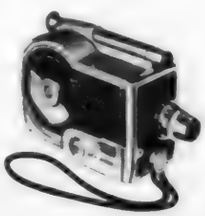

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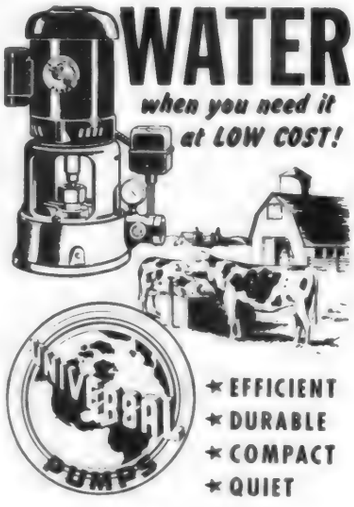

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CORN COB MEAL

(Continued from page 80)

will shell this fall more than 500,000 bushels of hybrid seed corn onto one cob pile. It was only natural that we would seek full knowledge about cobs.

"As soon as we heard of the Ohio Experiment Station trials we got in touch with Paul Gerlaugh and studied their results. They had never used a higher proportion of cobs than twice the amount of cobs that normally appear in ground ear corn. Up to that point they had concluded that cobs were two-thirds as valuable as shelled corn.

"We asked Gerlaugh what he thought would happen if we substituted 100% cobs for corn. He wouldn't even guess. So we got in touch with Dr. G. Bohstedt of the University of Wisconsin who had done a great amount of research on oat hulls, which we thought might be similar to cobs in feeding value.

"As a result of our inquires we decided to run an experiment of our own in the winter of 1946-47. We fed five groups of six head each varying percentages of cobs. Group No. 1 got ground shelled corn. Group No. 2 got ⅔ shelled corn and ⅓ cobs, which is as far as the Ohio Station has gone yet — Group No. 3 got half shelled corn and half cobs—Group No. 4 got ⅓ shelled corn and ⅔ cobs — and Group No. 5 straight ground corn cobs.

"All groups had two pounds of hay and all groups had protein. As the percentage of cobs went up, the amount of protein went up to make a decent balance because cobs were low in protein.

"The cheapest gain per hundred was on the cattle which ate no corn. The most expensive gains per hundred were the ones that ate straight corn. And that was true even though corn was worth only $1.25 per bushel.

"In the winter of 1947-48 we bought 600 head of cattle and fed them mainly on cobs. For 100 days we fed a per head per day rations as follows:

2 pounds of blackstrap molasses
4 ounces of urea (which was dissolved in the molasses)
3 pounds of soybean oil meal
20 pounds of ground corn cobs

"They had no hay whatever (which we believe was a mistake). They had no corn whatever. They had no bedding and no shelter and they were started on feed Christmas Day and the 100 day period ended in early April. So, they faced the two coldest months of the year in January and February, and literally belly-deep mud in March—extremely bad feeding conditions.

"In spite of which, they gained 135 pounds per head in 100 day period at a cost of approximately 20c per pound—they definitely looked like fed steers that were being fed corn for a shorter period.

"At the end of 100 days they looked as good as you would have expected them to look if they had been full-fed on corn for

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seventy-five to eighty days.

"We can only come to one conclusion and that is that cobs have something like ⅔ as much value, as shelled corn, pound for pound, when properly fed.

"We are absolutely certain that it is essential to increase the protein intake as the percentage of cobs goes up because they are lower than normal feeds in protein. And a careful examination run for us by the University of Wisconsin shows them to be low in vitamins—very low—so that it is necessary to feed some Vitamin A if a longer period than 100 days is to be used. I think it's almost essential to feed about two pounds of bright, leafy hay, or a pound of dehydrated alfalfa hay to supply sufficient vitamins.

"I believe it's a fair statement that no one else has ever commercially fed cattle where more than two-thirds of the total feed intake was corn cobs.

"We are so sure that cobs have a value of nearly two-thirds as much as shelled corn that we are planning on feeding something above 4,000 tons of corn cobs. next winter.

"To gain further knowledge, we have recently placed upon feed 19 head of little Hereford yearlings. The 19 head are now being fed a total of 45 pounds of molasses, five pounds of urea, fifty pounds of soybean oil meal, and fifty pounds of bright, alfalfa hay, and approximately 400 pounds of cobs. That is the total for 19 head per day. I figure at current prices, including the cobs at $3.00 per ton ground, the feed bill is 28c per head per day.

"It is my mature judgment that they are gaining more than 1½ pounds per day, but if they are only gaining 1½ pounds per day, the feed cost will be less than 20c per pound.

"We just got them on the cob diet and weighed them last Wednesday, June 9th. We expect to weigh them every two weeks, all summer long. My guess is that under ideal feeding conditions, which they will have this summer — which we certainly did not have last winter—that they will gain something like a pound and three-quarters, which would give us a cost of something like 16c."

The University of Nebraska reports, "We have conducted three trials in which additional corn cobs were fed with ground ear corn. In a general way, they do not disagree too much from the Ohio results."

Leslie E. Johnson, Head, Animal Husbandry Department, South Dakota College says, "During the past year we have been feeding a ration of corn and cob meal, alfalfa hay and soybean oil meal to a group of bull calves in our progeny test beef cattle breeding work. To our surprise, the bulls gained on an average of 2.8 pounds per day on that ration. We do not have a check ration, however, to compare the corn and cob meal with shelled or ground corn. Our experiment concerns the ability of different sets of calves to gain on a similar ration. Our

(Continued on page 143)

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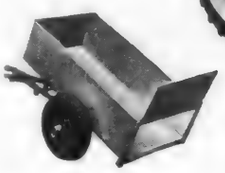

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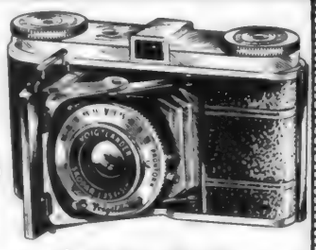

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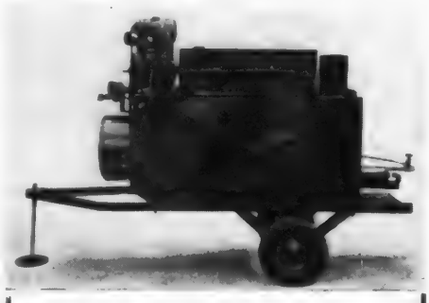

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LIME

(Continued from page 123)

lime, some of which contains a small percentage of magnesium and which has neutralizing value of near 100, is on sale in a number of Midwest states at prices ranging from $5.00 to $7.00 per ton.

Care should be taken in spreading the flour-fine types. In a high wind you may lime your neighbor's farm instead of your own. This type goes on well with a spreader which releases the lime near the surface. Truck spreaders are not the best for this type.

Because the coarser grades disintegrate slowly, it is well to remember that if your fields need lime NOW, more of the coarser grade must be applied in order to insure that there is enough fine particles available for this season's crop. After the first year, it is claimed that disintegration proceeds at a rate which will make the required amount available as replacement each year.

The availability of the various grinds is a point of controversy with agronomists and dealers. There is some agreement, however, that a 60 mesh screen grind will become available in one year; superfine will become 83% available during the growth of a crop. Grades coarser than 60 mesh screen grind will become available in a period of a complete crop rotation or longer.

Dr. G. W. Volk, Ohio State University soil chemist, who has been studying the effects of lime on crops for thirty years, says that he has found an intermediate grade of fineness (Agricultural Ground, Ohio specifications, 40 to 45% through a 100 mesh screen, and not less than 95% through an 8 mesh screen) to be the best for all purposes. "Liming should not be an annual job," he says. "Enough should be put on to last five or six years."

Various old-wives tales are circulated about the miraculous crop increases affected by lime. If your soil is very acid, but otherwise adequate, you may not be able to grow good clover or alfalfa at all; with adequate lime you may get three tons per acre. Increases in corn yield authentically reported vary from 10 bushels per acre to as high as 25 bushels. The results in your own particular case depend on how badly your soil needs lime. If it needs it at all you will get a crop increase—and at relatively small cost. Lime for soils is no longer a gamble. It's a sure winner, but how it functions in the soil is still somewhat of a mystery.

Don't use lime as if you were a soil miner. Use it in a rotation to favor the legumes. Remember legumes can't do well just on lime alone if there are other lacks. Any lack becomes a bottleneck for big crops. These bottlenecks are usually lack of potash and phosphate, and sometimes borax. All these must work with lime for the best results from the latter.

CORN COBS — (Continued from page 141)

experience, however, does show that corn and cob meal can be fed very satisfactorily—even to a group of young bulls."

Pennsylvania State College, Illinois, Cornell, Wisconsin, Michigan State, Purdue and Missouri report they have conducted no cob feeding experiments.

To understand why corn and cob meal doesn't work so well for hogs we must know why it does work for cattle and other ruminants. As any animal husbandry man will tell you a ruminant has four stomachs. His first stomach, the rumen, contains no digestive enzymes, but there are many digestion-aiding bacteria. One of the scientists who has worked along with Paul Gerlaugh on the nutritive end of the corn and cob meal experiments is Wise Burroughs of the Ohio Experiment Station at Reynoldsburg. Burroughs says, "The story of roughage utilization, and that includes corn cobs, hay and other fibrous feeds, is the story of the bacteria in the rumen, reticulum and omasum of ruminants. In everyday language that's the first, second and third stomachs. Our work leads us to believe that the bacteria in these stomachs can split fibers and turn them into good feed. A hog has only one stomach, and it is not a good place for these bacteria, consequently he can't make use of fibrous feeds."

Continuing, Burroughs points out, "Our swine department work has shown that it takes two weeks longer for a hog to hit the desirable weight of 225 pounds when corn and cob meal (ground ear corn) is used in place of ground shelled corn. For some farms where there are not a great number of hogs to be fed, and a self-feeder is used, ground ear corn may still be good practice. The time and money saved by not having the extra shelling operation or in eliminating a trip to the mill may easily offset the longer time required to fatten the hogs."

Corn cobs always have been used on the farm for starting fires, especially in the kitchen cook-stove. Here their quick short heat makes them just right for warming a pot of coffee or frying eggs and bacon. They have also been used for smoking meat, making bedding for chicks, and other homely uses we'll not list.

Chemical analysis shows the composition of dry corn cobs average as shown in this table:

Material	Pith	Shell
Nitrogen free extract	57.4	60.7
Fiber	37.2	35.4
Ash	2.6	1.7
Protein	2.2	1.9
Ether extract, or fat	.6	.3
	100%	100%

How About Milk Cows?

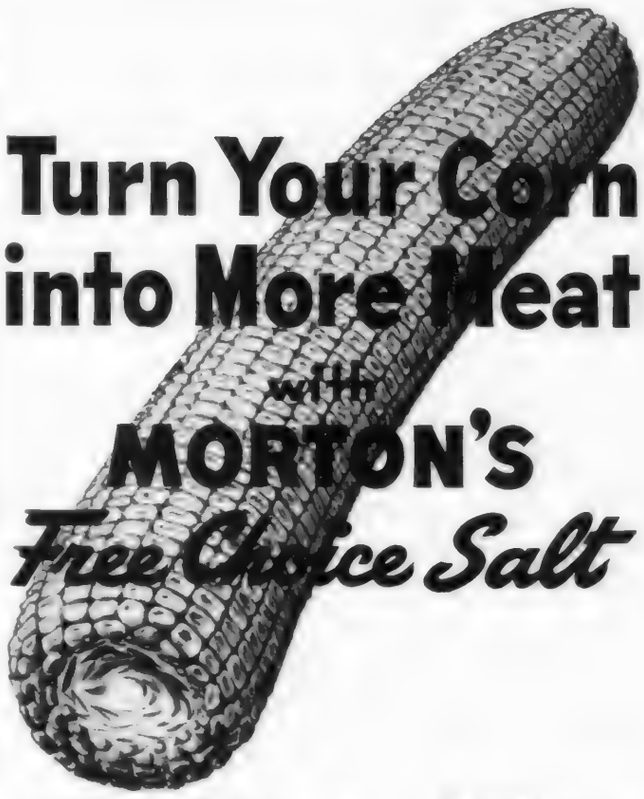
C. F. Monroe and W. E. Krauss of the Dept. of Animal Husbandry at Wooster have conducted tests on a dairy herd using a simple grain mixture and substituting corn and cob meal for the shelled corn.

Milk and butterfat were slightly higher on the shelled corn mixture. On a 30 day basis, converted to a 4% butterfat milk the production of these two tests showed that the corn and cob meal ration would produce approximately 98% as much milk as the shelled corn mixture.

	Ground Shelled Corn	Ground Ear Corn	Decrease in Pounds
TRIAL 1—26 COWS			
Group A	1173.6	1119.8	53.8
Group B	1230.2	1207.1	23.1
TRIAL 2—28 COWS			
Group A	1412.19	1301.3	111.6
Group B	1296.8	1230.5	66.3

The Year to Cut Costs

Whether the farmer operates in a "shelled corn" state like Iowa or in a "grind the whole ear" state like Pennsylvania it looks as though the prodigal corn cob is going to find a welcome at home this year, especially after the way he has shown he could cut feed costs in Ohio.



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With salt free choice, it take 321.4 pounds of corn to make 100 pounds of pork. Without salt, 451 pounds.*

Such savings enable you to feed, fatten, and finish more stock . . . sell corn . . . do whatever makes the most money. They also mean lower feeding costs . . . greater profits.

Hogs and other livestock need salt for proper digestion and assimilation. It supplies the chlorine for hydrochloric acid and the sodium for bile without which feeds are not digested but wasted.

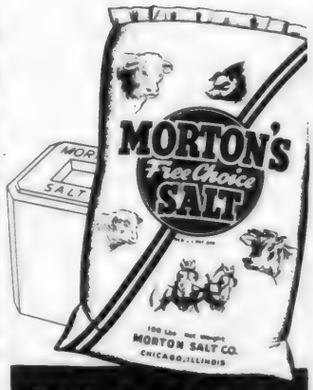
For best results, feed salt free choice — keep it before your animals all the time. Ask for Morton's Free Choice Salt by name — a brand specially developed for livestock feeding and formulated to remain non-hardening under normal use and storage conditions. Morton Salt Company, Chicago 3, Ill.

*According to Purdue University Tests

Salt Saves Feed because it supplies the sodium and chlorine needed by the digestive system — the sodium for making bile which digests fats and carbohydrates; chlorine for the hydrochloric acid which converts feed proteins into body tissue.

Feed Salt Free Choice for more profit. Some animals need more salt than others. The best way to feed it is free choice. Then each animal can take what it needs for maximum thrift, faster gains, lower feeding costs, and greater profits.

MORTON'S *Free Choice* SALT



NON-HARDENING
under normal use and storage conditions

Morton's Free Choice Salt is especially developed for livestock feeding. It's pure — easy to feed and easy to use for mixing, and formulated to remain NON-HARDENING under normal use and storage conditions. Be sure to ask your dealer for it BY NAME . . . MORTON'S Free Choice SALT.

FREE

BOOKLET ON FREE CHOICE FEEDING

Write for copy of "Free Choice Salt for More Profitable Livestock." This 40-page book is packed with facts every farmer and feeder wants to know. No other book like it. Mailed free. Address: Morton Salt Co., Chicago 3, Illinois.

A NEW WAY TO PLOW BY TOWNER

Thousands of progressive farmers from coast to coast are using the world famous TOWNER OFFSET DISC HARROW to supplement . . . even to eliminate . . . the old moldboard plowing operation.

Here's why:

TURNS THE SOIL TWO WAYS

And leaves a fine mulch without burying the top soil.

CUTS MORE LAND WITH LESS HORSEPOWER

Rolling moldboards give less drag, freeing horsepower for *useful* work. A 35-40 HP Tractor is adequate for a 10½' offset disc harrow.

LEAVES THE LAND LEVEL

Low draft line and a special frictionless hinge insures a level ground pattern all over the field.

CUTS 6" TO 8" DEEP

TURNS RIGHT OR LEFT

Available in sizes from 4½ feet to 24 feet, with mechanical or hydraulic control . . . with white iron bearings or oil bath bearings . . . with 22" or 24" blades.

Compare this amazing TOWNER OFFSET DISC HARROW with any other tillage tool. It is the perfect answer for open field, orchard or vineyard . . . for summer fallowing, seed bed preparation, turning under grain stubble, cotton or corn stalks . . . and for vegetable farming. See it, try it and you will till with Towner . . .

SEE THE TOWNER OFFSET DISC HARROW AT YOUR DEALER

TOWNER MANUFACTURING CO., Santa Ana, Calif.

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PRODUCERS OF

SPECIAL CORN HYBRID SEED

For Maximum Crop Satisfaction.

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Write For Full Information.

Remember—"It's The Harvest That Counts!"

WOODSON HOBBS AND SONS

KOKOMO, INDIANA

IXL FROST PROOF HYDRANT

Will Assure You Running Water Regardless How Low the Temperature

Merely bury the supply to the greatest depth of possible frost and this hydrant can never freeze-up. Thousands are rendering years of service on farms throughout the nation. So simplified even a child can repair. Only one flat washer on supply and backed by 58 years of manufacturing experience. No better frost proof hydrant on the market.

5 ft. overall size $9.90 f.o.b. Phila. Add for longer lengths **$1.00 per ft.**

Circular F-120 on request

For the man who demands the best.

THE IXL PUMP & MFG. CO., INC.
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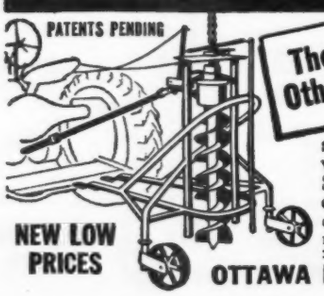
PHILADELPHIA 23, PA.

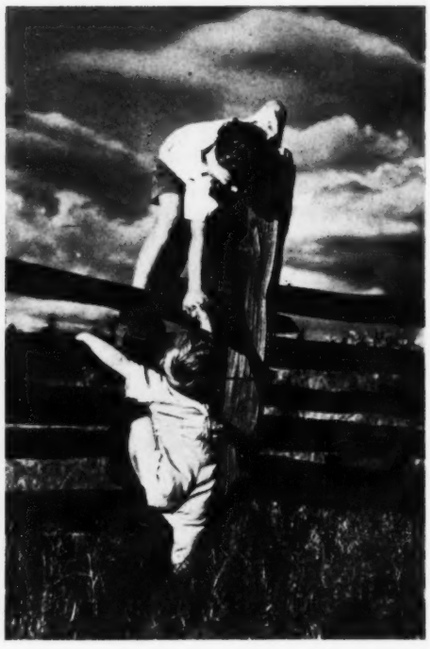
Makers of Water Closets and Tank Fittings Since 1890

OTTAWA POST HOLE DIGGER



Here's the tractor digger you have been waiting for. Quickly hitched to most any farm tractor with power take-off. Fastest power auger return —pull cord control. Heavy hi-speed 2-flight auger leaves hole clean. Castor wheels permit fast and accurate settings. Strictly a one-man digger. All controls from driver's seat. Safety clutch prevents damage, eliminates shear pins. Trench digging attachment. Get facts by sending for descriptive matter and low factory-to-user prices. *Serving the farmer for 44 years.*

OTTAWA MFG. CO., 7-889 Elm St., Ottawa, Kansas



THE FARM'S PICTURES

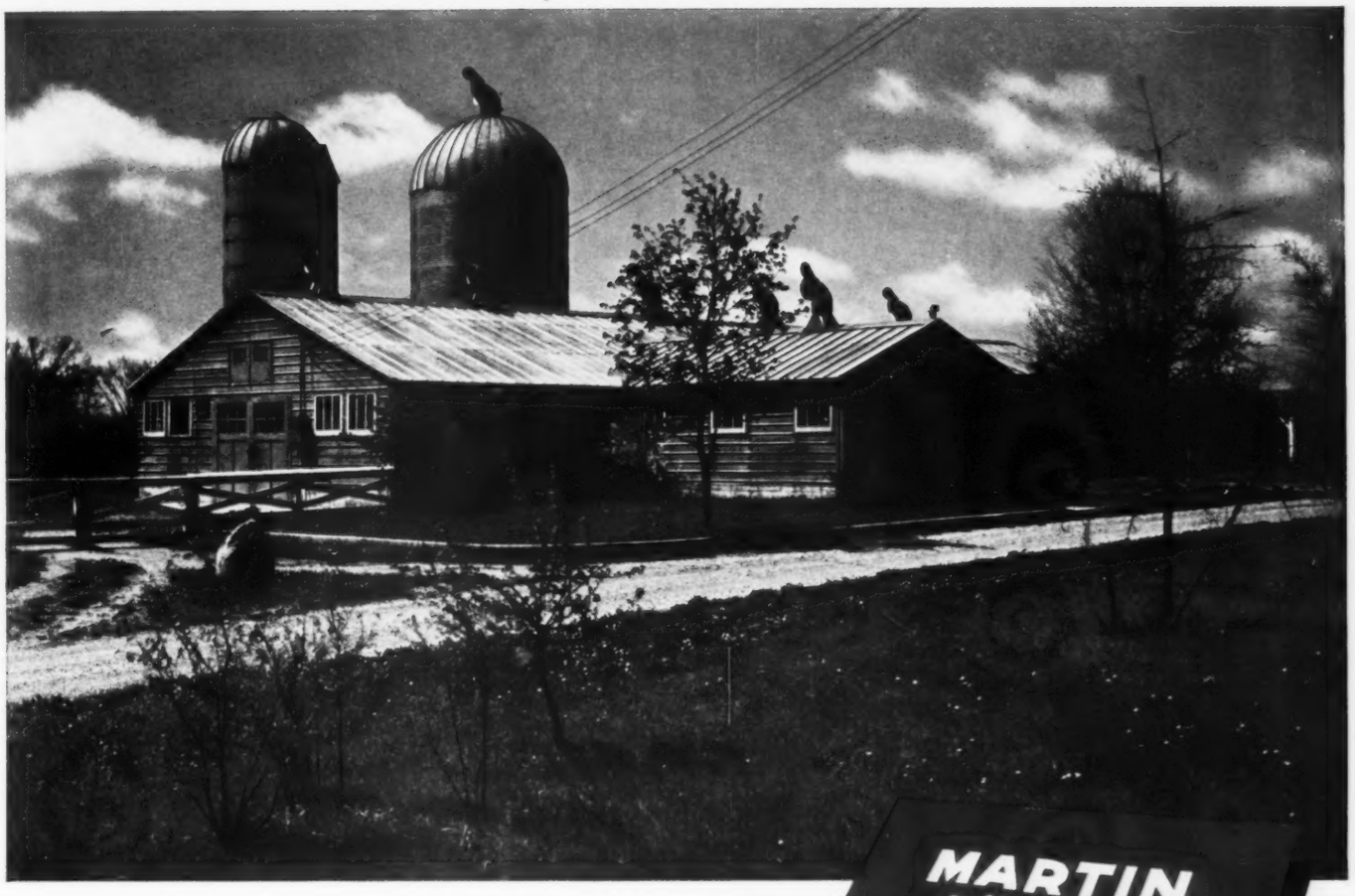
Cover by: Thomas Limborg

All photographs appearing in this issue were taken by Joe Munroe, staff photographer, excepting those listed below:

5—TVA. 16 through 25—John Collier, Jr. 26—U. S. Army Air Force. 28—Joe Munroe; U. S Weather Bureau; Joe Munroe; Eric Sloane. 29—Eric Sloane; Harold M. Lambert Studios; Joe Munroe. 30—U. S. Army Air Force. 34-35—Cy LaTour. 39—J. C Allen & Son. 40—Carl Mansfield; Allied Mills. 41—U.S.D.A. 42-43—W. J. Forsythe. 44—Crown Farm Implement Corp. 48—C. P. Fox. 55—Bureau of Plant Industry, Soils & Agricultural Engr. USDA (bottom). 57—Louis Frandrick-*Herald Times*. 59—J. W. McManigal. 61—Agricultural Chemicals Div.—Sherwin Williams Co. 62— Irene M. Heffner. 63—H. Armstrong Roberts. 64—J. C. Allen & Son. 66—Leon Cantrell. 67—L. Green-*FPG*. 68—TVA. 69—Watson-*Monkmeyer;* Cy LaTour. 70-71—C. Brooks—Standard Oil. 74-75—Alberta Small Strauss. 80-81—Milton Caniff—Chicago Tribune, New York News Syndicate, Inc.; U. S. Air Force. 82-83—U. S. Air Force. 112—USDA-Forsythe. 124—R. Carling. 144—J. S. Stanford.

PICTURES FOR FRAMING

Our enlarged photographic department can now accept requests from readers for pictures suitable for framing. To order, specify the page number, issue, and caption under the picture. The price is $10.00 for a 11 x 14 print (smaller when the proportion of the photograph does not suit these dimensions); and $15.00 for a mounted print. The photographs are made from the original negatives. Orders accepted for black and white prints only. Address Photographic Department, Farm Quarterly, 22 East 12th Street, Cincinnati, Ohio.



Make NEW Farm Profits *with* MARTIN All-Metal BUILDINGS

What portion of your profit each year is written off because of damage to your stored crops — losses caused by spoilage, shrinkage, fire, weather, rats? Ten per cent? Twenty per cent? The figure is often closer to fifty per cent!

Eliminate these losses and pocket a *new* profit from every feed crop you harvest. Cure and store hay and grain in scientifically engineered Martin All-Metal Farm Buildings designed specifically for the purpose — protect your crops to the full extent of their value.

Count as *new* profit, too, the better milk, better beef you'll get when you use hay and silage made the Martin way — there's less loss of important nutritive elements in your feed.

Look to Martin for *all* your farm building requirements—get Martin All-Metal Buildings as a first step to making your farm work easier, more productive, more profitable.

These typical installations of easy to erect, low cost Martin buildings include, top, a group consisting of Dairy Barn, Haymaker, Silo, Corn Crib and Implement Shed above, twin High Round Corn Conditioning and Storage Cribs below, Grain Bins and Corn Crib.

STEEL MARTIN Farm Buildings -BILT

Grain Bins • Silos • Haymakers • Corn Cribs • Dairy Barns • Utility Buildings

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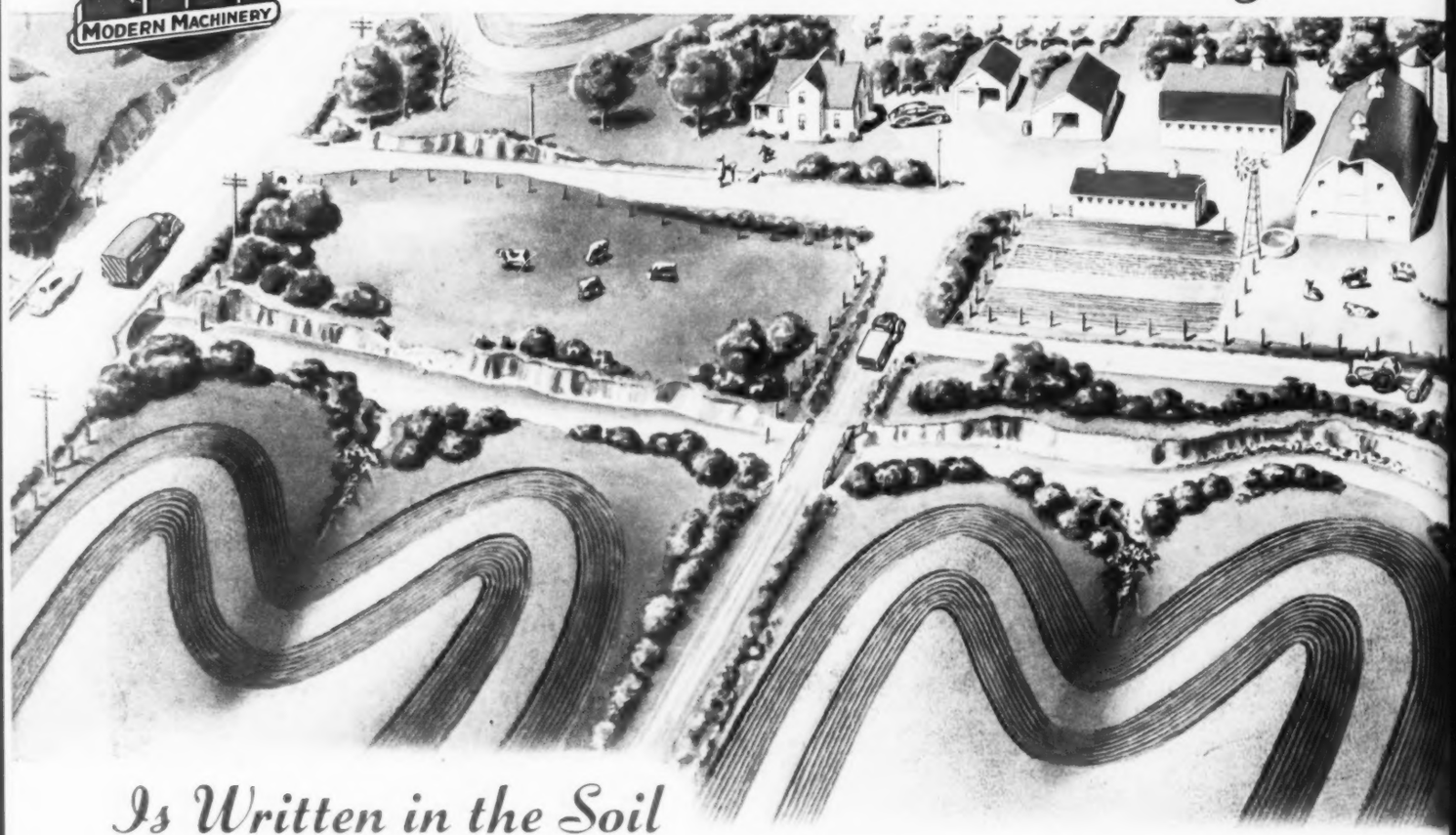
***PIONEERS** in the Design and Fabrication of **METAL** Buildings **EXCLUSIVELY** for the Farm*

MINNEAPOLIS MOLINE
MODERN MACHINERY

Our Economic Security...



Is Written in the Soil

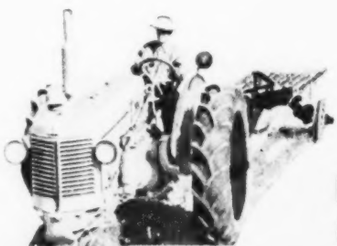
Last year we lost 500,000 fertile acres to erosion alone. Fertility was reduced and erosion started on millions of acres more! We broke 1,335,000 acres of sod land to replace it. *We are overdrawing the natural resources of agriculture, the industry basic to all industry . . . to all life . . . to all progress!* Progressive farmers who fallowed 8,700,000 acres and contour-farmed from eight to fourteen million acres of land are working for our economic security.

Productivity of our land is our greatest natural resource. Because it lies within the top few inches of the surface it is easily "mined". Yes, we have been stripping the soil of its fertility and overlooking the fact that all industry and all life is dependent upon the very thin skin of the earth's surface. No one knows exactly how long it took to create this top six inches or so of fertile land, but much of it has already been lost in a little over one hundred years of farming. Once completely lost it will take at least a hundred years or more to restore the top or growing layer of that small portion of the earth's surface that is able to produce food, fats, and fibers economically. Our natural resource of water for irrigation, for personal use, and for industry must also be conserved.

Our unique system of free enterprise allows us untold privileges . . . *and just as surely imposes obligations*, the first of which is to retain and to improve that system that has made America great! To achieve this aim we must give more serious attention to our neglected public schools, work together to avoid the necessity for restriction, cherish more dearly our personal liberty. *We must recognize sound soil conservation measures as the production boosters they are! A just but unrelenting Nature has conquered other nations that have ignored this fact.* You must do your share in conserving the land on your farms for yourself, your children, and your children's children.

Men who plan beyond tomorrow know that modern methods of agriculture will assure posterity of fertile, productive soil. That's why more and more progressive farmers demand MM MODERN MACHINES, VISIONLINED TRACTORS and POWER UNITS to put conservation plans into operation. They know that the MM trademark is the recognized symbol for quality machines built for safety too—MODERN MACHINES of *proved dependability and economy* . . . machines built to do the work with comfort and convenience . . . machines that with modern methods will help underwrite our economic security in the soil of the good earth.

Remember that you can use your regular MM farm machinery for all soil conservation methods. We suggest that you discuss your needs with your friendly MM dealer and local soil conservation authorities.



YOUR LAND IS YOUR BEST FRIEN

Conserve it

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